

The Iron Age

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Rolling-Mill Engines with Reversing Clutches.

From a recent issue of the *Engineer* (London) we reproduce the engravings on this page, illustrating a set of three-coupled rolling-mill engines erected at the works of the Woodside Steel and Iron Company, Coatbridge, England, by Messrs. Dick & Stevenson. The engines are furnished with ponderous reversing friction clutches and gearing, and embody several novel features. The designer, Mr. Stevenson, argues, according to the *Engineer*, that "plates or bars rolled at uniform speed are superior in tensile strength to such as are rolled by the staggering motion of reversing engines, and that many of the plate failures of which so much had been heard, such as that in one of the boilers of the Russian steamship *Livadia*, are due to defective processes of rolling more than the differences in the quality of the metal of which they are composed." His theory is that "the molecules of iron put in motion when attacked by the rolls in passes of the piece through them require time as well as pressure to adjust and settle themselves in their respective relations and dispositions; with the effect of obtaining the maximum tensile strength corresponding to the quality of the metal. The alternating quick and slow travel of the rolls results in spasmodic seizures of the metal's molecules upon each other, which is destructive of strength of hold and incompatible with homogeneous masses throughout individual plates—a fact which is obvious on microscopic inspection." These views will not perhaps meet with general assent, especially as Mr. Stevenson mentions the possible improvement under this head as analogous to that referred to by Dr. Percy in connection with the strength of wire; but that the varying speeds have some effect will no doubt be admitted. The three engines shown have each 36-inch cylinders, with 42-inch strokes. The two outside engines are coupled to two crank-shafts, which they drive continuously in opposite directions. These shafts are each connected at their inner ends to the center engine, which, by means of two connecting-rods working in opposite directions to each other, couple the shafts to the effect, combining the power of all the engines against resistance presented to either of the mill-wheels. The appearance of the whole system when in full action presents to the eye strange and mixed movements. Four engine connecting-rods rise and fall unevenly, yet all beat time like the legs of a trotting quadruped, while the clutch pieces and rolls seem now to spin round right and left, now to stop or start or now to join chase in one direction in obedience to the finger touches on small hydraulic controlling valves. These may be seen in the plan. Engines and gearing are embraced in one united and compact bed frame, and are bound to it on the level face of a solid square foundation, so that unequal wearing of the machinery or uneven setting of the foundations, through pressures and strains long directed on particular points, is prevented. The main castings of the structure are of selected tough iron, and its main malleable parts of mild steel. The cranks are forged solid with the shafts, and have crank-pins 10.5 inches diameter. The crank-shafts have necks 14.5 inches, and those carrying the mill-wheels and clutches have necks 16.5 inches diameter. The spur-wheels are 26.25 inches wide on the face, and are 8 feet 10.5 inches diameter. The weight of each set of wheels, with clutches and sliding boxes, is nearly 25 tons, and with the hydraulic reversing cylinders, central spindles, crabs, and their relative appurtenances, make up a total weight to be carried by each mill-shaft of about 30 tons. The teeth of the wheels, as will be seen from the illustration, are formed on Stevenson's zigzag or quadruple helical design, with a central web between the two sets of teeth; the pitch is 7 inches. These teeth are claimed to be 30 per cent. stronger than those of the ordinary double helical form, because they present an arch throughout half the total breadth of teeth toward the driving pressure in whichever direction the wheels and pinions drive. Second, the zigzag lines give greater sectional area of metal by virtue of their double apex. The whole has been worked out by careful reference to past experience, and the results will no doubt be looked for by rolling-mill engineers and owners with interest.

Iron Sleepers on German Railways.

—A correspondent of *Kuhlow's* refers to the apprehension felt in Rhenish-Westphalian iron circles that the Government intends to return to the use of wooden sleepers in railway construction and repairs. A few months ago the iron and steel producers made urgent representations to the Minister of Works on the matter, and the decision of the Prussian State Railway Department is awaited with anxiety. During last year contracts for iron sleepers were given to the extent of 63,000 tons, the amount for the year 1885-86 being 35,000 tons. For a large number of old and new roads wooden sleepers have been exclusively used, so that it is computed that the amount of iron substituted by wood is 50,000 tons. This represents about 70,000 tons less production of pig iron, while the loss in wages would be very great. Taking all the material used in the production of

50,000 tons of sleepers—coal, coke, refractory material, ore, pig iron, &c.—it is calculated that a less consumption of 575,000 tons of material would be implied.

Engineering Accidents.

From a recent issue of the *Engineers* we take the following interesting article on engineering accidents:

Engineers have very largely contributed to the happiness of mankind, but it must be admitted that they have also introduced elements and agencies which have caused much misery and suffering, both of mind and body. In the seventeenth century no one was killed by boiler explosions, and Mr. Huskisson was the first man slain by a railway accident properly so called. Some thousands of individuals have been killed, mangled or maimed by machinery which would have no existence but for the engineer; and it might be argued with some show of reason that the members of our profession have not been as careful to obviate disasters as they have been to attain the objects they have had in view. The answer to such a line of attack is, of course, that when mischief is done it is the result of accident; but it is worth while to consider whether this is true or not—whether disasters following on the labors of the engineer are or are not unavoidable, and whether there really is such a

and avoided, while others could not possibly have been anticipated. The latter are, however, comparatively small in number, and a very considerable proportion of the events called "accidents" are not in any proper sense of the word accidents at all. Take, for example, the Stepney boiler ex-

porance lay at the root of the matter in both cases. Neither the owner of the boiler nor the gaugers who repaired the road were aware of the consequences which must ensue on the line of action which they adopted. This may be quite true. Indeed, we will go further and admit that nearly all the so-called accidents result from ignorance; but this will not help us much to prevent them, because the ignorance which leads to an accident is very often willful. There can be no doubt that a very great number of accidents is strictly preventable, while others are nothing of the kind, and it is to the former that we desire to direct attention. When a ship is caught in a gale of wind and is wrecked on a lee shore that may be regarded as an accident.

If a horse takes fright at a heap of stones by the roadside, runs away and upsets the carriage behind him, killing its occupants, that is no doubt, in the dictionary sense, strictly an unavoidable accident. But we venture to add that accidents of this kind are not engineering accidents, and that in one word there ought to be hardly any engineering accidents. Every possible contingency can either be guarded against now or means can be devised to guard against it in future. More care, more forethought and a greater exercise of skill and invention than has yet been brought into the service would almost eradicate engineering accidents from the world.

riages left the rail, and there was a smash. But the modern tire does not depend on continuity for its efficiency. The modern tire may be broken right through in several places, and still it will do its duty and cling to the wheel. Derailments occur now and then through the breakage of crank axle. It may yet be found possible to build engines which will not be derailed even if the crank axle does break. This end has been very nearly attained even now; for, although a large number of crank axles break every year, few passengers are killed or wounded by their failure. The introduction of the block system and efficient continuous brakes have in like manner done a great deal to make railway traveling safer than it was in times past. It will be found that what is true of railway working is true of almost everything with which the engineer has to do, and that engineering accidents may in nearly all cases be classed as strictly preventable. The engineer deals with the forces, so called, of nature, but he does not deal with any uncontrollable force. He could not deal with an uncontrollable force. To do that is left for such geniuses as Mr. Keely. It is quite true that the forces of nature are stupendous; but man cannot do anything with them in the stupendous phase. He can only take a very little bit of each, and use it just as far as he can control it—no more. The energy which is in a sense stored up in a great powder magazine is no doubt very great; but if a man can only get a thimbleful of powder out of the magazine he cannot do much mischief with that. But it must not be forgotten that the force does not wear out or change, while the means by which it is controlled does, and the escape of natural forces from the condition of servitude into which the engineer has brought them is always due, not to the inherent power of the slave, but to the wearing out of his fetters. A steam boiler can be made when new to resist a given pressure—say 150 pounds on the square inch—and its powers of doing mischief are so far limited. It is nothing to the purpose that the power of steam is in the abstract unlimited. So long as the boiler is well designed, well made and in good order, the force of so much steam as the boiler represents when at work is quite under control. If, however, the boiler is suffered to waste away and become weak, then an explosion will take place; but the explosion is not due to the irresistible force of steam, as some persons think, but to the circumstance that the boiler, originally strong enough, has become too weak for the work it had to perform.

From what we have said it should be clear that so-called "engineering accidents" result not from the uncontrolled forces of nature, such as that which operate when a ship is driven ashore, but from neglect in some shape or form either to maintain in their integrity the power of the agency by which we control so much of a natural force as we have been able to utilize, or to provide means by which the loss of integrity of the controlling agency may be rendered innocuous. The first is accurately illustrated by a steam boiler. When that boiler is at work there are so many thousand foot-tons of energy locked up in it, which, if the shell plates or flues give way, will be let loose in a moment to do fearful mischief. The strength of the boiler plates is the agency by which we control the force of the steam. If the plates are allowed to become too weak by corrosion there is an explosion, but the result of negligence, ignorance or parsimony. Mansel's tire is an apt illustration of the second proposition. The agency with which we control centrifugal and other forces operating on and in the tire is its strength. It is possible that we may be deceived as to this, and therefore we bring in a second contingent agent to combat centrifugal force if the tire should fail because of some weakness which we cannot discern. If there were no possible means either of making sure that all tires were sound, or that their failure would not result in the derailment of a train, then when a tire did break that would be strictly an accident. Happily it may be said that the list of dangerous failures of parts of machines is rapidly growing less and less. Improved methods of construction, better materials, design and workmanship all tend day by day to eliminate true accidents and induce sensible, competent engineers to regard with more and more doubt theories intended to relegate accidents to the category of unpreventable. In nine cases out of ten it will be found that the so-called accident, instead of being the result of chance, has really been brought about by simple agencies having nothing occult about them. When a crane chain breaks and some men are killed, we may rest assured that it did not break by accident, but just because it was too weak for its work, and that had proper precautions been observed it would not have been too weak. The number of railway accidents which occur is very small. Almost the only one of any importance which now takes place happens when, both lines being fouled by the breakdown of a train on one line, another proceeding in the opposite direction and close by at the time runs into the wreck and is thrown off the road. We do not suppose that a period will come when no one will be killed, or even injured, by the productions of engineers, but we venture to hope that the number of deaths and injuries may be made much less

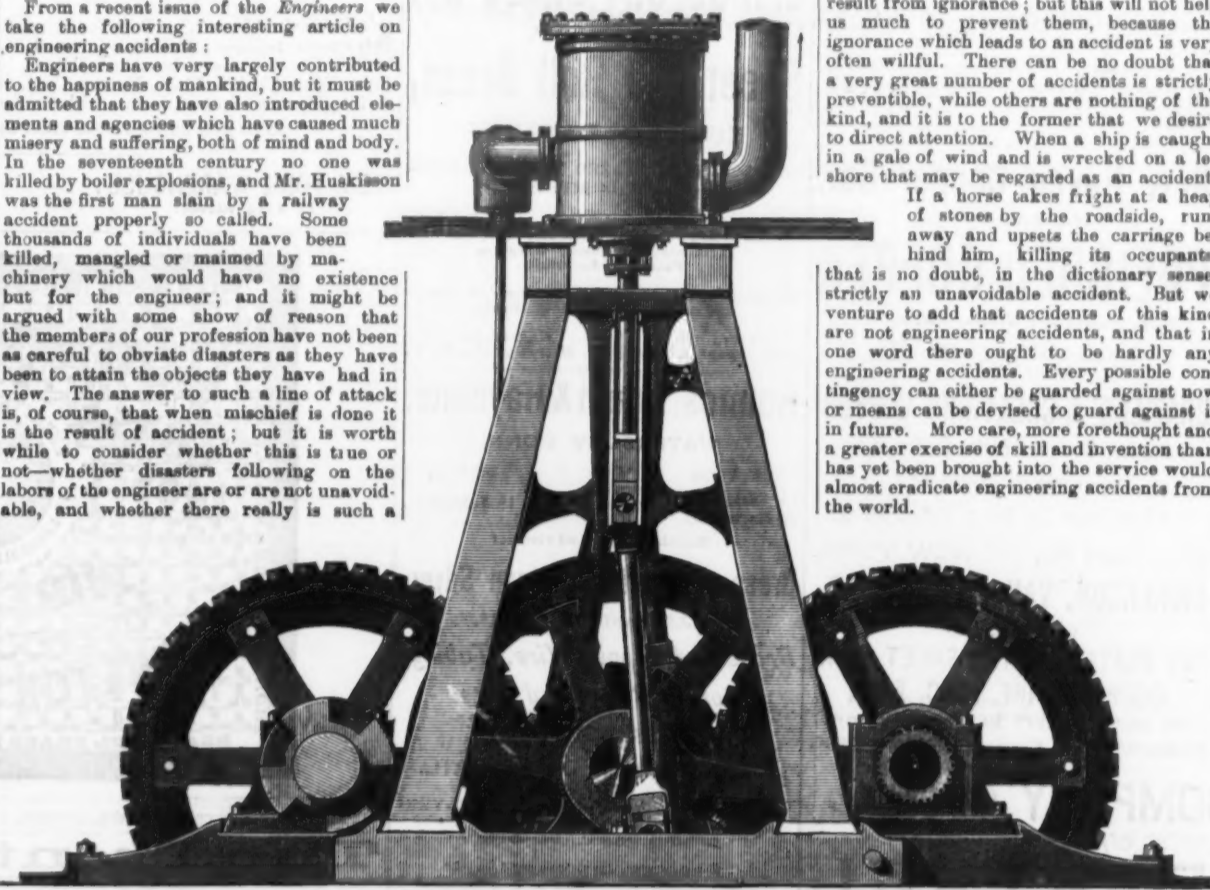


Fig. 1.—End Elevation.

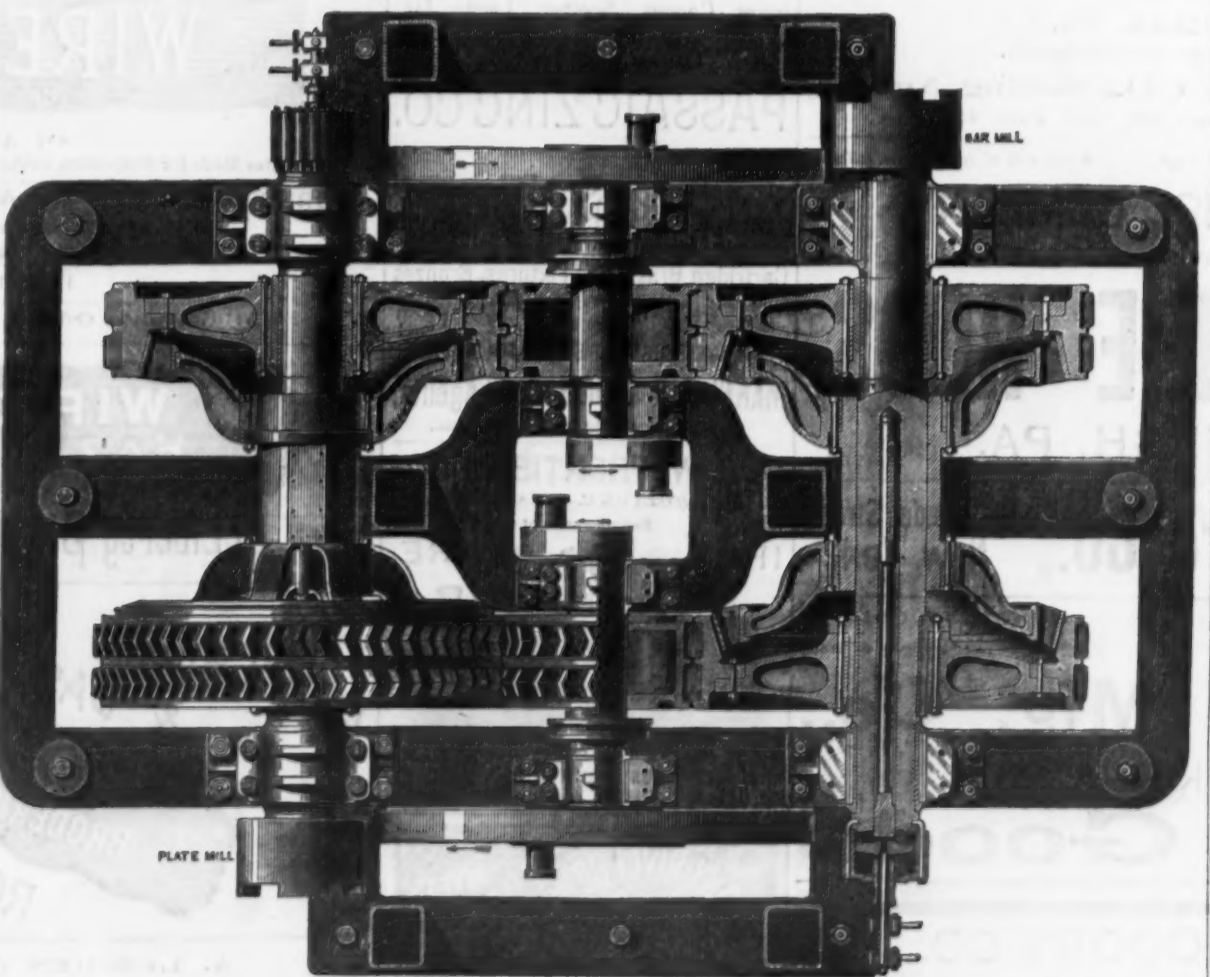


Fig. 2.—Plan.

THREE COUPLED ROLLING-MILL ENGINES WITH REVERSING CLUTCHES.

thing as an engineering accident. First, let us clearly define what the word "accident" means. If we turn to the dictionary we find "accident" to be an unexpected event, chance." In other words, it means the occurrence of something unforeseen—something that is not and cannot be anticipated; something which, although it may be brought about by man's agency, has not been purposely brought about.

There are, however, two sides to this question. Many so-called accidents are events which might have been anticipated

and the catastrophe which happened recently near Portadown, in Ireland. In the first case the boiler would not have exploded if the owner had ascertained by proper examination that the shell was extensively corroded. In the latter, so far as can be gathered from the evidence at present available, the train ran off the rails because the sleepers lay loose on a thin bed of ballast, and were not packed or secured in any way. These catastrophes obviously resulted because the indispensable conditions of safety were not present. It may be said that ig-

A great deal has already been done in this direction; much remains to be accomplished. Some years ago many deaths and maimings occurred every year by the fracture of railway tires. No amount of examination could detect hidden flaws buried in the substance of the metal. But Mr. Mansel and other engineers working with the same object succeeded in devising systems of making and fixing tires which rendered such "accidents" impossible. The old tire depended for its security on its continuity. If the tire broke in any place it left the wheel, and the car-

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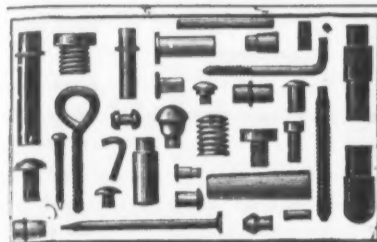
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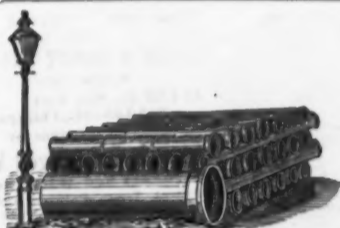
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To turn a set of locomotive tires, says the *National Car and Locomotive Builder*, is not necessarily a heavy or expensive operation, but it causes the engine to be taken into the shop for a few days, and if this happens when traffic is crowding the operating department the loss of the engine is an inconvenience. A set of tires that will run twice as long between turning as another set thus becomes an important element in reducing the expense of repairs, and often keeps an engine in service when the extra work done is worth far more than the price of first-class tires. This being the case, master mechanics are naturally anxious to use tires that will make long mileage without turning, but there is great diversity of opinion as to what conditions will prolong the life of tires by reducing wear and tear. On no subject connected with locomotive engineering do we find railroad mechanical men more disposed to talk or to ask for suggestions. There is no disposition to abuse tire-makers for producing an inferior article, as there is with those who are intimately interested in the wear of steel rails and blame the makers for supplying steel mixed with cinder, but there are many complaints about the tires not wearing longer than they do. The circumstances connected with the wear of tires are often of a nature to puzzle the observer. A master mechanic who devoted careful attention to the tire question mentioned a curious performance of a set of tires. The engine was on heavy passenger service, and was run continually by one engineer. The tires were put on in the beginning of winter, and ran close on two years before they needed turning, having made about 18,000 miles to each 1/2 inch of wear. At the end of another year the tires had to be turned, with about 5000 miles to the 1-16 inch of wear. After that the engine made about 20,000 miles to the 1-16 inch of wear for the remainder of the life of the tires. There was no extra work done during the period the tires wore fast, and the same man held the throttle. Of course this is a striking instance of the "uncertain in locomotive engineering," but there was a cause for the rapid wear if it only could have been discovered, and it would be a good work in the cause of knowledge if those who come in contact with "mysterious" cases of this kind would display energy and ingenuity in finding out their origin.

Complaints that we have heard made about the tires of certain locomotives wearing badly in comparison to others are susceptible of easy explanation. Tires wear in two ways. The weight of the engine pressing upon the drivers leads to abrasion of the surface coming in contact with the rail, and as the wheels roll round the tire wears away by the minute bruised particle dropping off. That is the wear of rolling friction. The second method of wear is that of sliding friction, where the slipping of wheels on the rails grinds away the tires, as an emery-wheel wears away the surface from any article put in contact with the revolving face. The sliding friction where it comes much into action is by far the most disastrous to the life of locomotive tires. Inordinate slipping of driving-wheels results from two leading causes—very hard tires and too little weight on the drivers. The art of making steel tires is so highly perfected that tires too hard for economical service are rarely produced. When an engine is noted for slipping badly the cause is nearly always that the cylinders transmit too much power for the adhesive weight upon the drivers. The engineering world has never discovered or settled upon a limit of the weight that can safely be placed on driving-wheels, but a few years ago Mr. Chanute and a few other engineers insisted on limiting the weight on each wheel to 12,000 pounds. This teaching for a time exerted powerful influence upon the designing of our locomotives, and its effect is still apparent on many roads. The weight was insufficient for engines with cylinders larger than 15 x 24 inches, with drivers 5 feet in diameter, but many large cylinder engines were built with the weight on the drivers little beyond the limit mentioned. Slippery locomotives and the attempted remedy of a stream of sand constantly dropping on the rails will always be found on a road or division where the tire mileage is low. While investigating this subject we obtained some carefully-collected statistics relating to the wear of tires on different classes of locomotives. The information gave the capacity of the cylinders, the size of driving-wheels and the weight upon them, the kind of service the engine was employed upon and the mileage made upon 1/2 inch of tire wear. The figures indicated that the man at the throttle had a good deal to do with the conservation or destruction of tires, a matter which most master mechanics are perfectly competent to deal with, but on the whole the tire wear was in the inverse ratio to the weight on the driving-wheels. The case of two classes of eight-wheel freight engines running on one division and doing similar service may serve as a specimen of the whole. All the engines had driving-wheels 57 inches diameter. The first class had cylinders 17 x 24 inches and 25 tons on the driving-wheels. They ran an average 3476 miles per 1-6 inch wear of tire. The second class of engines had cylinders 18 x 24 inches, and the weight on the drivers was 26 tons. They made an average of 2945 miles per 1/2 inch wear of tire. Where a master mechanic is troubled with unequal wear of tires he should classify his locomotives, showing the tractive power of cylinders and the weight on drivers. Where this is done valuable information will nearly always be obtained if the tire wear is carefully ascertained.

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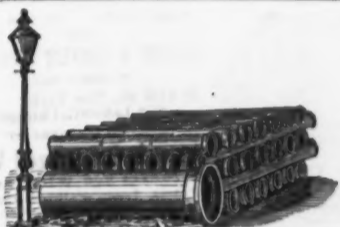
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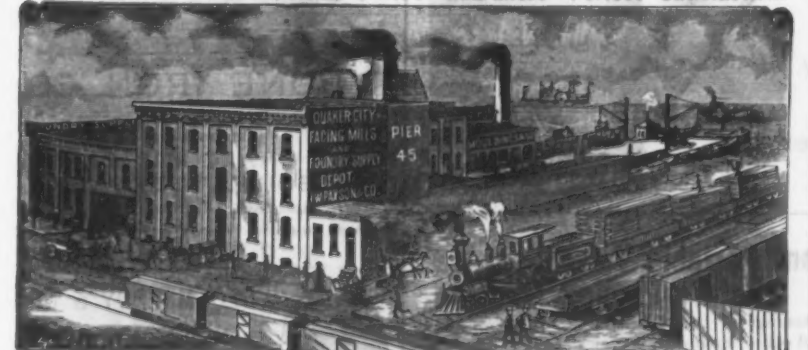
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Wear of Locomotive Driving-Wheel Tires.

To turn a set of locomotive tires, says the *National Car and Locomotive Builder*, is not necessarily a heavy or expensive operation, but it causes the engine to be taken into the shop for a few days, and if this happens when traffic is crowding the operating department the loss of the engine is an inconvenience. A set of tires that will run twice as long between turning as another set thus becomes an important element in reducing the expense of repairs, and often keeps an engine in service when the extra work done is worth far more than the price of first-class tires. This being the case, master mechanics are naturally anxious to use tires that will make long mileage without turning, but there is great diversity of opinion as to what conditions will prolong the life of tires by reducing wear and tear. On no subject connected with locomotive engineering do we find railroad mechanical men more disposed to talk or to ask for suggestions. There is no disposition to abuse tire-makers for producing an inferior article, as there is with those who are intimately interested in the wear of steel rails and blame the makers for supplying steel mixed with cinder, but there are many complaints about the tires not wearing longer than they do. The circumstances connected with the wear of tires are often of a nature to puzzle the observer. A master mechanic who devoted careful attention to the tire question mentioned a curious performance of a set of tires. The engine was on heavy passenger service, and was run continually by one engineer. The tires were put on in the beginning of winter, and ran close on two years before they needed turning, having made about 18,000 miles to each 1/2 inch of wear. At the end of another year the tires had to be turned, with about 8000 miles to the 1-16 inch of wear. After that the engine made about 20,000 miles to the 1-16 inch of wear for the remainder of the life of the tires. There was no extra work done during the period the tires wore fast, and the same man held the throttle. Of course this is a striking instance of the "uncertain in locomotive engineering," but there was a cause for the rapid wear if it only could have been discovered, and it would be a good work in the cause of knowledge if those who come in contact with "mysterious" cases of this kind would display energy and ingenuity in finding out their origin.

Complaints that we have heard made about the tires of certain locomotives wearing badly in comparison to others are susceptible of easy explanation. Tires wear in two ways. The weight of the engine pressing upon the drivers leads to abrasion of the surface coming in contact with the rail, and as the wheels roll round the tire wears away by the minute bruised particle dropping off. That is the wear of rolling friction. The second method of wear is that of sliding friction, where the slipping of wheels on the rails grinds away the tires, as an emery-wheel wears away the surface from any article put in contact with the revolving face. The sliding friction where it comes much into action is by far the most disastrous to the life of locomotive tires. Inordinate slipping of driving-wheels results from two leading causes—very hard tires and too little weight on the drivers. The art of making steel tires is so highly perfected that tires too hard for economical service are rarely produced. When an engine is noted for slipping badly the cause is nearly always that the cylinders transmit too much power for the adhesive weight upon the drivers. The engineering world has never discovered or settled upon a limit of the weight that can safely be placed on driving-wheels, but a few years ago Mr. Chanute and a few other engineers insisted on limiting the weight on each wheel to 12,000 pounds. This teaching for a time exerted powerful influence upon the designing of our locomotives, and its effect is still apparent on many roads. The weight was insufficient for engines with cylinders larger than 15 x 24 inches, with drivers 5 feet in diameter, but many large cylinder engines were built with the weight on the drivers little beyond the limit mentioned. Slippery locomotives and the attempted remedy of a stream of sand constantly dropping on the rails will always be found on a road or division where the tire mileage is low. While investigating this subject we obtained some carefully collected statistics relating to the wear of tires on different classes of locomotives. The information gave the capacity of the cylinders, the size of driving-wheels and the weight upon them, the kind of service the engine was employed upon and the mileage made upon 1/2 inch of tire wear. The figures indicated that the man at the throttle had a good deal to do with the conservation or destruction of tires, a matter which most master mechanics are perfectly competent to deal with, but on the whole the tire wear was in the inverse ratio to the weight on the driving-wheels. The case of two classes of eight-wheel freight engines running on one division and doing similar service may serve as a specimen of the whole. All the engines had driving-wheels 57 inches diameter. The first class had cylinders 17 x 24 inches and 28 tons on the driving-wheels. They ran an average 6476 miles per 1-6 inch wear of tire. The second class of engines had cylinders 18 x 24 inches, and the weight on the drivers was 26 tons. They made an average of 2945 miles per 1/2 inch wear of tire. Where a master mechanic is troubled with unequal wear of tires he should classify his locomotives, showing the tractive power of cylinders and the weight on drivers. Where this is done valuable information will nearly always be obtained if the tire wear is carefully ascertained.

A locomotive boiler with too little heating surface may be made to steam better by increasing the size of the fire-box. Instances are on record where locomotives have been greatly improved by having had the backs of the fire boxes taken out and the fire boxes lengthened 12 inches.

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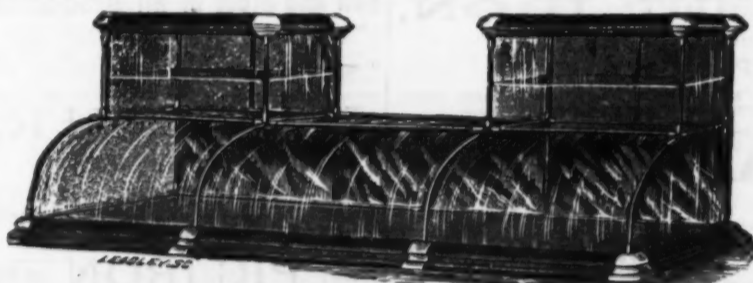
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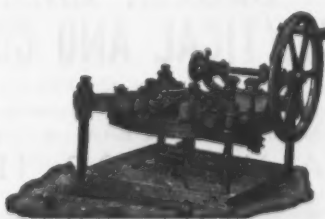
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The Oldest and Most Extensive Manufacturers of
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Fig. 120. Fig. 200. Fig. 70.

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The fact of the great strength and durability of this sink, as it is practically free from danger of break-
age in transportation, handling or use, is a strong point in its favor, and that its merits are recognized by
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We beg to call the attention of Architects, Builders, Dealers, and
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an effective and durable one, neat in appearance, easy to put on,
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wire made expressly for us and for this particular purpose, with
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ANCHOR NAILS AND SPIKES. BRAND
Capacity, 1000 Kegs per Day.
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The most serviceable Truck for store, warehouse or rail-
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DETROIT, MICH.
Correspondence Solicited and Satisfaction Guaranteed.

**Changes in the Blast-Furnace In-
dustry in the Past Five Years.**

Many curious and interesting facts appear
in the pages of the new "Directory" of
the Iron and Steel Association, which give
to them a historical as well as descriptive
value, which are referred to in the fol-
lowing words, in the preface:

The oldest furnaces in the country are
Oxford, in New Jersey, and Cornwall, in
Pennsylvania, both built in 1742. We re-
gret to learn that Oxford is now out of
blast and not likely to make any more pig
iron. Cornwall is now idle, but has not
been abandoned.

All the furnaces in New England now use
charcoal. The furnace at West Stockbridge,
Mass., was the last to use anthracite, and it
has been out of blast for several years.
Vermont, which once had several active
furnaces, has not had a furnace in blast
since 1882. There is not now one charcoal
furnace in New Jersey, where formerly
there were many.

The manufacture of pig iron with coke
made in Central and Western Pennsylvania
has made rapid progress in many eastern
localities in late years. This fuel is now
largely used as a mixture with anthracite
in furnaces which formerly used anthracite
exclusively. The use of raw coal in fur-
naces west of Pittsburgh is also rapidly giv-
ing away to coke.

Carnegie Brothers & Co., Limited, are
now building two furnaces at their
Edgar Thomson Works, which when com-
pleted will make seven in all. These
seven furnaces will have a combined annual
capacity of 450,000 net tons of pig iron.
Adding the capacity of the two Lucy
furnaces to that of the Edgar Thomson fur-
naces, the whole nine furnaces being prac-
tically under one management, the total
capacity of the nine furnaces is about 600,-
000 net tons per annum. This is the largest
annual capacity of any furnaces under one
management in this country. The next
largest is that of the furnaces of the North
Chicago Rolling Mill Company, at Chicago
and Milwaukee, 432,000 net tons. The ca-
pacity of the Carnegie system is probably
the largest furnace capacity under one
management in the world.

Allegheny County, Pa., built its first
furnace in this century (Clinton), as late as
1859; it now has 17 completed furnaces and
three in course of erection. No other sec-
tion of the country has made as rapid progress
in the manufacture of pig iron as
Allegheny County.

Notwithstanding the tendency of late
years to build large furnaces—each of
which will do the work of a dozen or a
score of the old furnaces—there are still to
be found running in Pennsylvania, Virginia
and some other States small and old-fash-
ioned coal-blast furnaces which make only
5 or 6 tons of pig iron daily. Speaking of
Pennsylvania, there are yet remaining in
that State of rich mineral fuel 24 charcoal
furnaces. No two of these furnaces are
under one management. Ohio still has 16
charcoal furnaces in the Hanging Rock
region, but only one outside of that district.

The Hanging Rock charcoal furnaces are
generally banked up on Sunday, and blast is
only stopped on this day in some of the bi-
tuminous furnaces of this district. There
is also a charcoal furnace in Michigan which
stops its blast on Sunday.

The great shrinkage in the number of
blast furnaces in Kentucky certainly ought
not to have happened. There are now only
six furnaces in the State that do not belong
in the abandoned list. We have transferred
to this list in recent years 15 charcoal fur-
naces and one bituminous furnace. Not one
new furnace has been built in Kentucky
since 1881, and the two furnaces built in
that year have been abandoned.

Only two furnaces are now left in Indi-
ana. In Michigan all the furnaces use char-
coal except one, and it has not been in op-
eration for years.

The manufacture of coke pig iron is now
general in most of the Southern States which
have a pig-iron industry. Only a few years
ago these States made only charcoal pig
iron. The introduction of the use of coke
in the Southern States has most benefited
the pig-iron industry of Virginia, Tennessee
and Alabama.

The oldest iron-ore mine in the United
States that is now in operation is the Iron
Hill Mine, in Delaware, which was discovered
as early as 1684 and soon afterward
opened. Ore is still taken from this mine
and used in Principio Furnace, Maryland,
the first stack for which furnace was built in
1723. Although the Iron Hill Mine sup-
plied ore to a Maryland furnace, there is
now no furnace in Delaware, in which State
it is located, nor has there been for many
years.

Philadelphia is usually referred to as a
leading iron center, and so it is if its im-
mediate surroundings be considered, but it
does not itself produce much iron or steel.
Its iron and steel industries have made no
headway whatever in the last 15 years.
Nor does Cincinnati make any progress as
an iron center. It is not so prominent in
this respect as it was in the palmy days of
the Hanging Rock region. It is conspicu-
ously lacking in a single steel plant of any
description whatever. Upon the other hand,
Pittsburgh and Chicago are making rapid
progress in producing iron and steel, and to-
day they are the great iron and steel cities
of the country. Cleveland and Wheeling
more than hold their own as producers of
iron and steel, and San Francisco is also
making steady progress, but Milwaukee,
Detroit, St. Louis, Boston and Baltimore
are not so active as they have been, while
Buffalo, once active, has almost ceased to be
regarded as an iron city. This list em-
braces all of our large cities which have
been prominent in the manufacture of iron
or steel. New York City never attained
any prominence in this direction.

The furnaces which the American Iron
and Steel Association places on the active
list in the last edition of its "Directory" pos-
sess a very much higher average capacity,
and are consequently of a very much higher
average type, than those which were em-
braced in the same list in previous editions.
Thus in the edition of two years ago, to go no

further back, 675 furnaces were credited with
a total annual capacity of 9,300,000 net tons,
or an average of 13,777 tons each. In the
present edition 578 furnaces are credited
with a total annual capacity of 9,960,700
net tons, or 17,233 tons each. The furnaces
which have been built in recent years are
chiefly of large size and modern equipment,
while those which are transferred to the
abandoned list are chiefly of small size and
antiquated equipment. The figures of total
annual capacity are derived from individual
returns of furnace owners, and are based
upon the assumption that it is possible for
all the furnaces in the active list to be in
blast for a whole year. As this condition is
impossible under the most favorable circum-
stances, it follows that the actual aggregate
capacity of the furnaces of the country is
much less than the nominal capacity.

**Working Costs of Fast Atlantic
Steamers.**

In a review of two papers on Atlantic
steamers recently read before the British
Institution of Naval Architects the En-
gineer, of London, says:

One of the first things to suggest itself
about such ships as the Etruria or the
Umbria is the vast cost at their effi-
ciency has been obtained—a cost which no
one in his senses would have suggested a
quarter of a century ago. We do not here
so much refer to the outlay of capital on
ships and engines, enormous as that is, as on
the working expenses. Let us compare the
performance of the Etruria with that of the
Britannic. An interval of nearly 10 years
separates the construction of the two ships.
The Britannic is still running. Her con-
sumption is, we believe, about 90 tons of
coal per day of 24 hours. Her passages aver-
age 8 days 9 hours outward and 8 days 2
hours homeward. Her consumption may,
allowing for getting up steam, &c., be taken
at 840 tons per voyage. The Etruria's fast-
est passage has been 6 days 5 hours 31 mi-
nutes. Her average we do not know, but we
shall not be far wrong if we call it 6 days
12 hours. She burns 320 tons of coal per
day of 24 hours, or, making allowance for
getting up steam, &c., 2250 tons of coal on
the trip. She makes the passage in a day
and a half less than the Britannic. To save
this day and a half the consumption of coal
is augmented by no less than 1400 tons.
That is to say, the consumption has been
nearly doubled to save 36 hours in time.
This is startling enough, but figures yet
more remarkable may be obtained. Let us
take, for example, the Servia, and compare
her with the Etruria. The best passage of
the latter is, in round numbers, 6½ days;
the best passage of the former is, also in
round numbers, 7 days. Using the figures
given by Mr. John, of the Barrow Shipbuild-
ing Company, and neglecting coal spent in
getting up steam, &c., we have for the
Etruria, 315 × 6.25 = 1968.75 tons; and for
the Servia, 205 × 7 = 1435. That is to say,
over 500 tons of coal are expended in shorten-
ing the passage by 18 hours. It may be urged
that this is not all, and that the difference in
the dimensions of the two vessels must be
taken into account. But it so happens that
the Servia is a larger ship than the Etruria,
the displacement of the former vessel being
10,960 tons, and of the latter 9860 tons, or
1100 tons less. The indicated horse-power of
the Servia is 10,300, and that of the
Etruria 14,321. The latter ship has 1.45
indicated horse-power per ton of displace-
ment; the former a little less than 0.94
indicated horse-power per ton of displace-
ment.

The enormous increase in horse-power re-
quired to put on a knot or a fraction of a
knot in speed explains the difference in the
coal consumption of the two ships. Nor
does the additional expense end here. It
will be seen that not only can the Servia
make a trip with 500 tons less coal than the
Etruria, but she has available for some pur-
pose or another 1100 tons more displace-
ment. Part of that can be devoted to cargo,
part to passenger space, even after due
allowance is made for the greater weight of
the hull. But, furthermore, the boilers and
engines of the Etruria weigh a great deal
more than do those of the Servia. The more
carefully we investigate the construction
and performance of the two ships the clearer
does it become that the price paid for reduc-
ing the time of transit between Liverpool
and New York seems to be out of all propor-
tion to the result gained. If such a ship as
the Etruria can be made to pay her way,
then the profit earned by such a vessel as
the Servia must be very large, while that
earned by the Britannic ought to be colossal.
We believe that the truth lies between the
two statements, and that the fastest ships in
the Atlantic trade are partly supported out
of the earnings of their slower sisters. Mr.
John has hinted that the express Atlantic
steamer of the future will carry no cargo,
and this, we think, is more than probable.
If any ship is built to beat the Etruria it is
clear that there will be no space left for
cargo—engines, boilers and coal demanding
every ton of displacement available.

It is said that an engineer of Pesth, Mr.
Pradanovic, has lately used dynamite for
driving piles. A circular cast-iron plate,
15 inches in diameter and 3¼ inches thick,
is fixed on the pile to be driven, in a per-
fectly horizontal position. A dynamite car-
tridge made in the form of a disk, 6 inches
in diameter and ¼ inch thick, and contain-
ing 17¼ ounces of dynamite, is placed upon
the cast-iron plate and exploded by electricity.
It is stated that the depth to which the pile
is driven by each explosion is equal to five
blows of an ordinary pile engine weighing
14½ Vienna cwt., falling 9 feet to inches.
A cast-iron plate on an average resists 25
explosions.

In regard to the economical application of
work after it has been produced to the pro-
pulsion of vessels, there is room for great
improvement, for, according to the late Mr.
Froude, the greatest authority on this sub-
ject, only about one-half of the total power
exerted by the engines is effective in prop-
elling the vessel, the remainder being ex-
pended in overcoming frictional and other
resistances.

Paris, 1878.

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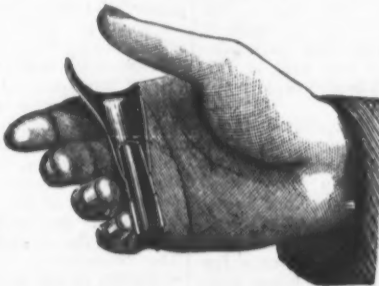
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[A. W. BRINKERHOFF'S PATENT.]

ADJUSTABLE TO FIT ANY HAND.

Made for Either
Right or Left
Hand.



Can be Worn
over
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Will not make the Hands Sore! Made Entirely of Brass, without
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SEND FOR ILLUSTRATED CATALOGUE.

CRIMPED

LIGHTNING HAY KNIVES. WEYMOUTH'S PATENT.

This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each of 60 pounds weight, suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY

HIRAM HOLT & CO., East Wilton, Franklin Co., Maine,

For sale by the Hardware trade generally.

CAUTION:

We are informed that various parties are infringing upon the widely known Letters Patent granted originally to George F. Weymouth for an improved Hay knife.

The characteristic feature of the invention is a curved blade, provided with saw-tooth cutters, and furnished with suitable working handles. It is our purpose to prosecute all infringement, and to hold responsible to the full extent of our ability and of the law all parties who manufacture any knife infringing upon the patent, or who deal in the same. Several suits have been already ordered.

All manufacturers and dealers are hereby warned of our rights, and the public are cautioned against purchasing any Hay Knives which are not of our genuine manufacture.

HIRAM HOLT & CO.

East Wilton, May 10, 1886.

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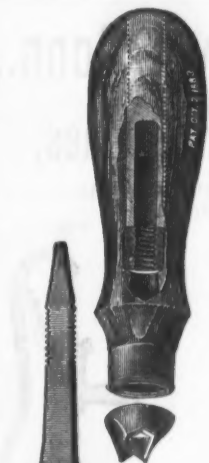
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there has been no particular movement to note, save that the market generally has been very quiet, with consequent rumors of

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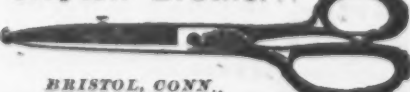
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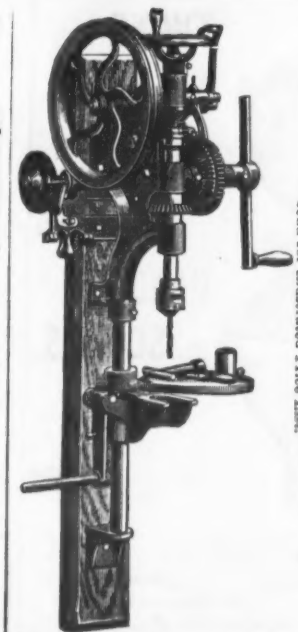
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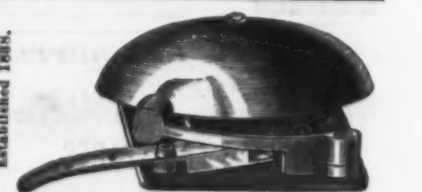
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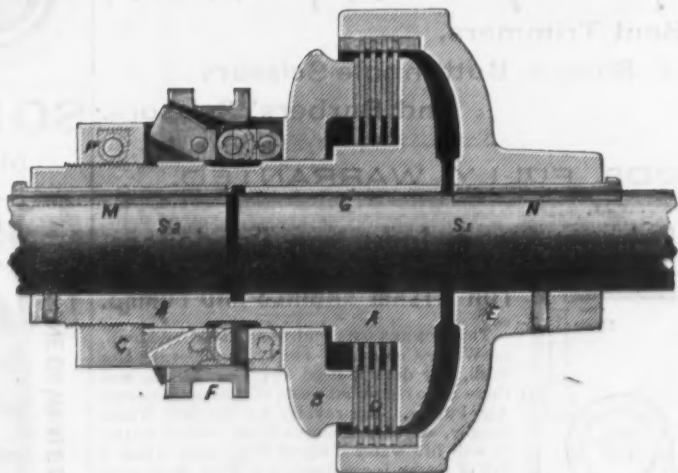


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Atlantic Steamers.

In a paper on "Atlantic Steamers," presented to the British Institution of Naval Architects at its last meeting, Mr. W. John reviews in an interesting manner the history of ocean steamships.

The Great Eastern, he remarks, steaming up Milford Haven about 25 years ago, between two lines of the Channel Fleet of old—two and three decked wooden line-of-battle ships—the whole fleet saluting with yards manned, was a sight to be remembered. More than this, that ship, with all her mournful career, has been a useful lesson and a useful warning to all naval architects who seriously study their profession—a lesson of what can be done in the safe construction of huge floating structures, and a warning that the highest flights of constructive genius may prove abortive if not strictly subordinate to the practical conditions and commercial requirements of the times.

The Sirius and Great Western crossed the Atlantic in 1838, and in 1840 the first ship of the since celebrated Cunard Company made her first voyage. This was the Britannia, which, with her sister ships the Arcadia, Caledonia and Columbia, kept up the mail service regularly at a speed of about 8 1/2 knots an hour. The Britannia was 207 feet in length between perpendiculars, and 34 feet 4 inches extreme breadth, 22 feet 6 inches depth of hold, 423 horse-power—nominal—and 1156 tons burden, built of wood and propelled by paddles. In 1850 the Collins Line started in opposition to the Cunard, and after a series of disasters collapsed in 1858. This was three years after the Persia, the first Cunard built of iron, had been completed. In 1850 also the Inman Line was started with the City of Glasgow, of 1600 tons builders' measurement and 350 horse-power. She was built of iron, and was the first screw steamer sent across the Atlantic from Liverpool with passengers, and was the pioneer of the great emigrant trade which Mr. Inman, above all others, did so much to develop and make cheap and comfortable for the emigrants themselves, as well as profitable to his company. That the builders of the celebrated old Great Britain in 1843, and Mr. Inman in 1850, should have pronounced so decisively in favor of the screw propeller in preference to the paddle for ocean steaming is a proof of their true practical judgment, which time and practical experience have made abundantly clear. While the Cunard Company went on developing its fleet from the early wood paddle steamer Britannia of 1130 tons in 1840 to the iron paddle steamer Persia, &c., in 1858, the iron screw steamer China of 1862, to the still more important screw steamers Bothnia and Scythia, vessels of 4335 tons in 1874, the Inman and other lines were as rapidly developing in speed and size, if not in numbers. The year 1874 is memorable, for it saw the White Star steamers Britannic and Germanic put into the water, as well as the Inman steamer City of Berlin and the two before-mentioned Cunard steamers Bothnia and Scythia. By the addition of these two ships to their fleet the White Star Line, although started in 1870, reached a front rank position in the New York passenger trade. The author gave in separate tables the logs of several of these ships, some from published documents and some kindly furnished by the owners. The Great Western had crossed the Atlantic from Bristol to New York in 15 days as early as 1838. The first Cunard steamer, the Britannia, was about the same speed, from 8 1/4 to 8 1/2 knots an hour. The average duration of the Cunard voyages in the year 1856 was 12.67 days from Liverpool to New York, and 11.03 days from New York to Liverpool. The Bothnia, in 1874, reduced the passage to about nine days. The White Star Britannic, in 1876, averaged 7 days 18 hours 26 minutes outward from Queenstown to New York, and 9 days 6 hours 44 minutes homeward, and has averaged for the last 10 years 8 days 9 hours 36 minutes outward, and 8 days 1 hour 48 minutes homeward. The City of Berlin, of the Inman Line, also built in 1874, 8 days 10 hours 56 minutes, and homeward 8 days 2 hours 37 minutes, and for the nine years, from 1875 to 1883 inclusive, averaged outward 8 days 10 hours 56 seconds, and inward 8 days 8 hours 34 seconds, or, putting it into rounder figures, the Britannic had reduced the average passage between the two points to 8 1/2 days, and the City of Berlin to 8 1/2 days. From the year 1874 on to 1879 no further advance was made in Atlantic steaming, but in that year the Arizona was added to the Guion Line, and it soon became evident that another important stride had been made in the Atlantic passenger trade which would lead to most important results. The results, as we all know, have been sufficiently startling. The Guion Line, which had started in 1866 with the Manhattan, had now the fastest passenger ship on the Atlantic. In spite of burning some 50 per cent. more coal than the Britannic, the ship was an obvious commercial success. The spirited policy which brought her into existence was appreciated by the public, and the other lines had to move forward. Then followed a period of rivalry, the Cunard Company building the Gallia and Servia, the Inman Company the City of Rome, and the Guion Line the Alaska, all of which were completed in 1881, and afterward the Oregon for the Guion Line, 1883; the Aurania the same year for the Cunard Company, and, later still, the America for the National Line, and the Umbria and Etruria for the Cunard Company in 1885.

Since the completion of the Etruria, for various reasons there has been a pause in the tremendous strides made since 1870, and we may briefly review the results. Taking the Britannic as a standard with her 10 years' average of 8 1/2 days across, and her quickest passage of 7 days 10 hours 53 seconds, we have now the following steamers of higher speeds. Taking them in the order of their absolutely fastest passage out or home they stand thus:

	Days.	Hours.	Min.
1, Etruria.....	6	5	31
2, Umbria (sister ship).....	6	10	35
3, Oregon.....	6	13	44
4, America.....	6	18	0
5, City of Rome.....	6	18	37
6, Alaska.....	6	23	55
7, Servia.....	7	1	1
8, Aurania.....	7	1	1

It will thus be seen that from the 15 days' passage or thereabouts of the earliest Atlantic steamers we had got down in the days of the Scotia to about 9 days; in the Britannic to 8 1/2 days, and at the present time we have got to 6 1/2 days, with seven ships afloat that have done the passage under 7 days, and capable of making their average passages range between 6 1/2 and 7 1/2 days.

Ranked in order of gross tonnage, these eight vessels stand as follows:

1, City of Rome.....	8,144
2, Oregon.....	7,875
3, Aurania.....	7,389
4, Servia.....	7,312
5, Umbria.....	7,129
6, Etruria.....	7,100
7, Alaska.....	6,586
8, America.....	5,528

Here the America shows to advantage, for while being eighth in size she is fourth in point of speed, and from what the author can learn, although he had no authenticated details on the subject, he believed she is economical in coal consumption. One of the most difficult subjects in connection with the propulsion of ships on which to get absolutely accurate data is that of coal consumption. The records of from six to eight hours' trials for the purpose of ascertaining the coal consumption are absolutely worthless, as all shipbuilders and engineers know, and, so far as English ships are concerned, they are never attempted. Foreign owners frequently stipulate for such trials in their contracts with English shipbuilders, and get wonderfully economical results on paper, but the fact that the trials only extend over a few hours renders them valueless, however carefully the coal may be weighed during that period. An authentic record of the absolute quantity of coal consumed, say by each of the eight fastest Atlantic liners, together with their average indicated horse-power, on the voyage for a series of voyages would be extremely valuable.

A Railway-Tie Nursery.

Hon. R. W. Phipps, Forestry Commissioner for Ontario, has been for several months devoting his time to visiting the principal fruit-tree nurseries and estates, where attention is given to arboriculture for timber and fuel. In a recent letter from Southern Kansas to the Toronto Globe he writes:

"One railway board here, knowing that the growing of trees when set out in earnest is neither a slow nor difficult task, have established in Kansas the largest artificial plantation of forest trees in North America. These railway gentlemen themselves gave out the contract for planting over a square mile of land with young saplings of the catalpa and alantus, and their president, observing the success of their experiment, and impressed with its probable excellent financial results, has had planted at his own expense as a speculation as much more. These are situated near the little town of Farlington, Kan. These plantations, now bare of leaves, stretch far over the undulating prairie in full view of the town. The different sections have been planted, it appears, respectively two, four and six years ago. About one-fourth is planted with the alantus, the rest with the catalpa, and a few—perhaps 1000 trees—of white ash. Those first planted are now about 25 feet in height, the last about 12. Some of the taller are 7 inches through the stem. The first seedlings were brought from Illinois by the railroad, the rest grown in seed beds here. There are in all about 3,000,000 of trees in full-growing vigor on these plantations, this calculation leaving out a few on some small portions of poor land which are not flourishing so well, but will be good trees in time. All were planted 4 feet apart each way to shade the ground, but 8 feet is the ultimate intention, which will allow three-fourths of the trees to be cut out, a thing which can well be done when they are fit for fence-posts, say, 7 to 9 inches through, or, if required, they can stay even longer without injuring the plantation. When rather larger it is expected the trees will make excellent railway ties, and at their fuller growth of 15 or 20 years they will supply very valuable timber for cabinet-work and house-building. Those who have only seen the original forest, with its trees growing at haphazard here and there, little ones and big, have but a very vague idea of the large amount of wood the closely-planted groves can spare in their process of growth. This process, partly natural, is also by the art of the planter rendered partly mechanical. Extensive masses of young trees planted in this manner are restricted to but one method of advancement—the endeavor to throw out masses of leaves to the light and air of the upper surface. The lower branches, hidden in shade, rapidly die and fall to the ground, and the plantation becomes a multitude of long, straight stems, full of life and vigor, but only spreading into branch and foliage at the summit. If a tree in youth be crooked it straightens itself, if thus surrounded, as it advances in height. One acre so growing will give of wood, which is all the better taken, quite a number of cords yearly till all the superfluous trees are gone. On each acre here there are 2000 more trees planted than will ultimately be allowed to attain full growth. There will be left perhaps 900,000 to come to maturity, and as these, as well as being very useful timber, are fast-growing trees, the profits seem likely to be very large."

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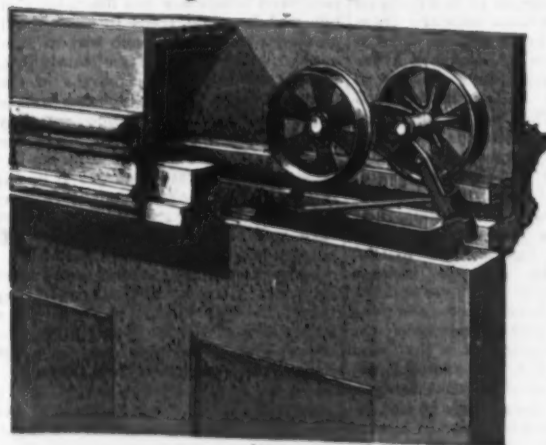
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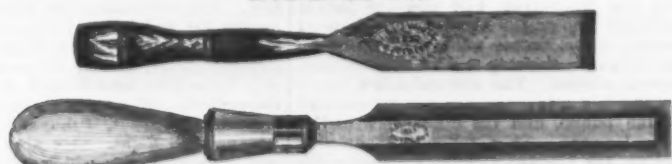
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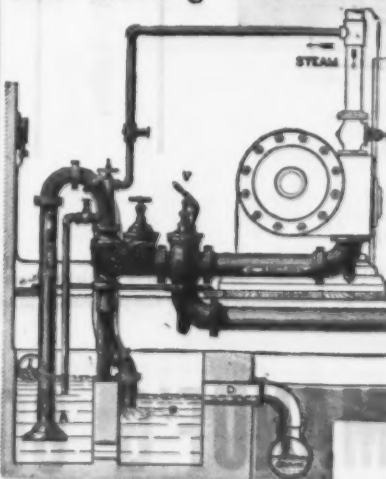
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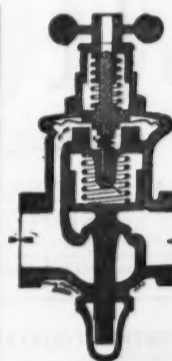
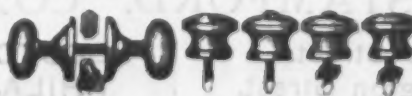
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Economical Quay Walls.

Though the cost of foundations by means of compressed air has been greatly reduced within recent years, there are cases where pilework foundations are still advantageous. As quay walls must be accessible for vessels, it is impossible to strengthen them like ordinary retaining walls by a large batter on the face, by widening out the foundation at the outer toe, or by a mound of rubble in front. Accordingly, as far back as 1837 the plan of pushing forward the foundation by means of sloping piles was adopted at the Glasgow quays. A similar system, with improvements, has been adopted for the new Rouen quay walls, and is briefly described in an abstract of a foreign paper published in the "Excerpt Minutes" of the British Institution of Civil Engineers. The bed of the Seine at Rouen is about 32 feet below the required quay level, and a layer of silty sand overlies the hard chalk which is found at about 25 feet below the river bed. Instead of building a quay wall 33 feet high, on an unstable foundation, or carrying it down to the solid chalk, a wall, only 18 feet high, has been built upon piles sloping forward toward the front, and reaching down to the chalk. The thrust of the filling for the quay is kept off from the back of the wall by a mound of rubble stone, and by a layer of rubble stone resting upon a platform supported on piles, carried back far enough for the natural slope of the filling behind, going between the foundation piles under the wall, not to protrude in front of the face of the wall. The wall rests upon four rows of piles, of which the three front rows have a batter of 1 in 5; while the back row, and the four rows supporting the platform behind, are vertical. The lower part of the wall for a height of 5½ feet is composed of concrete, and is 11 feet wide, and the upper portion is built of rubble masonry, and has a width of 6½ feet at the bottom. The wall has a batter of 1 in 8, and is faced with brickwork. The cost of this wall was about \$120 per lineal foot. The latest design of quay wall, which is now being built at Rouen for extending the quays, is similar in construction, but has been carried 3½ feet lower down, owing to the increasing draft of vessels coming up to Rouen, and in order to allow heavier weights to be placed near the edge of the quay. The concrete is deposited within water-tight caissons of beech 68 feet long on the top of the piles. The wall is strengthened by iron tie-rods at intervals of 35 feet, bolted to large blocks of masonry placed about 66 feet back from the face of the wall. The last type of wall costs about \$127 per lineal foot, exclusive of the dredging for placing the toe of the slope low enough for the anticipated deepening of the channel.

The writer then compares the Rouen quay wall with the New York quay wall along the Hudson River, as executed since 1876. The New York wall is similar in type, being a slight wall of concrete and masonry, backed with rubble, and resting upon long vertical and sloping piles; but the piles are surrounded by a rubble mound which projects in front of the wall, and the wall, though higher than the Rouen wall, is much thinner at the base, and its lower portion has been built with grooved concrete blocks. The top of the wall is about 35 feet above the bed of the channel, or about the same as at Rouen; but the piles are driven about 20 feet deeper at New York than at Rouen. The cost of the New York wall, after deducting expenses incurred in the removal of old works, was about \$200 per lineal foot. It is suggested that the experience of Rouen shows that the rubble surrounding the piles at New York might have been safely dispensed with, that the projection of the rubble mound in front of the face of the wall is prejudicial to vessels, and that the cheaper wall of the Rouen type would have been better for New York than the type adopted. It is considered, however, that for a long length of quay the concrete block foundation employed at New York would be more economical than the concrete in mass deposited in frames. The above quay walls are less durable than the Antwerp quay wall, founded on firm ground, at a depth of about 60 feet below quay level, or intermediate between the depth reached by the foundation piles at Rouen and New York. The Antwerp quay wall, founded by aid of compressed air, is strong enough to resist the thrust of the filling at the back, and also a surcharge of 5 tons per square yard on the quay; but it cost about \$469 per lineal foot, or nearly two and a half times the cost of the New York wall, and more than three and a half times the cost of the Rouen wall. The quay wall at Ghent, founded on firm ground met with at a small depth, cost only about \$157 per lineal foot. The concrete well foundations of the Ninth Dock at Havre proved an economical system under the special conditions of the site, having cost about \$174 per lineal foot. Different systems are accordingly advisable under varying conditions; but the Rouen type of quay wall has the advantage of enabling quay walls to be extended at ports which, through want of resources, have hitherto possessed inadequate quay accommodations.

Distressing mine accidents are now so frequent that every means which can be brought into requisition to alleviate the suffering or determine the exact condition of the victims deserves careful attention. At Chancelade, near Périgueux, France, lately, there occurred a mine accident by which five men were imprisoned, and strenuous efforts were made for their rescue. A relief hole was drilled from the top of the hill. It had a diameter of 0.3 m. and a depth of 70 m. But the hole, unfortunately, did not pierce an accessible gallery. In order to determine, however, the exact state of things in the mine, it was decided to photograph the interior, and for that purpose an ingenious photographic apparatus was designed by M. Langlois, of Paris. The camera was pivoted at one end within a metallic case, and above and below were placed a number of incandescent lamps that could be lit and extinguished by means of a switch from above. The camera could be pointed at any angle by means of a chain which communicated with the surface, and in this way different views could be taken. At the

top of the well a dark room was built, so that the sensitive plate was not affected, and the apparatus was lowered with the lamps extinguished. After arriving at the bottom the lamps were switched on and the plate in the camera was thus exposed to the light and to the surrounding objects. In this manner a number of different views were obtained.

Foreign Markets.

FRANCE.
PARIS, August 25, 1886.—Metals.—There are no signs yet of a revival in the demand. Copper is lower. Lead higher, and Tin and Spelter have been steady. We quote toward the close, in francs, 100 kg.: Copper—Chili Bars, 101.25 @ 105; Ducots and Slabs, 106; Best Selected, 108.50, and Pure Corocoro Ore, 105. Tin—Banca, 271.25; Hilliton, 268.75; Straits, 262.50; Australian, 261, and English, 262.50. Lead, 32.25 @ 32.50, and Spelter, 31.50 @ 32. Iron.—The French iron markets have on the whole been quiet. Till Parliament meets again many projects of public works will remain in suspense. Prices have been steady in this city at 14.50 @ 15 francs per 100 kg. Merchant. The Northern Railroad of France will want 15,000 tons of Steel Rails, for which the adjudication is soon to come off. Old Rails are tending upward there, and are at present worth 7 francs per 100 kg. At the North the iron market is quiet, but this does not prevent prices from being fairly held. There is a steady demand for Rivets in the Hardware line. The Bolt works and foundries, on the other hand, are not very busy. The syndicate embracing the North Haute-Marne, Ardennes, and Meurthe-et-Moselle has been renewed. In the Haute-Marne No. 1 Coke Merchant is selling at 13 francs; Mixed at 14; Wire Nails No. 18, in bulk, 21.50 @ 22. There is less doing at St. Etienne, in Central France; Merchant still commands 15.50 francs there. Coal still remains dull, but prices remain steady, a speedy revival being looked for.—*Monteur des Intérêts Matériels.*

BELGIUM.
BRUSSELS, August 25, 1886.—Iron.—The formation of the syndicate still exercises a good influence on the Belgian iron market. We do not hear of a giving way of prices any more, although not all works are occupied to the extent of their capacity. Meanwhile the syndicate's efforts have tended to establish a correct proportion of value between the different species of Finished Iron. This does not imply, however, that Pig Iron also should rule any higher than it does at present; it can only be expected to rise if production be curtailed somewhat in England. As for Finished Iron, it would rise if makers in Germany succeeded in forming a syndicate after the model of our own. Meanwhile we quote Charleroi Foundry Pig, 5.75; Luxembourg do., 5.90; Aulus Forge Pig, 5.80; Charleroi, 5.7 @ 47; Merchant, 10 francs; Angles, 11.50; do. for vessels, 12.25; Sheets, No. 2, 12.50; No. 3, 14.50; Commercial, 15.50; Thin, 16.50; No. 4, 20.50; Steel Sheets, 15.50 francs per 100 kg. Some orders for steamers and cars have dropped in during the week. The general business outlook is rather encouraging than otherwise, and the iron trade ought to be favorably influenced by it. Crops here on the whole turned out satisfactory in Europe; nobody expects war, and money is still procurable at fair rates, while raw material of all kinds is low enough to stimulate consumption. In view of all this a good fall trade is looked for. The Coal market has meanwhile been slowly reviving at well-sustained figures.—*Moniteur Industriel.*

GERMANY.
HAMBURG, August 25, 1886.—Iron.—There is a better inquiry in various branches, but the prices offered are unremunerative. Pig Iron, however, still continues more offered than there is a demand for. Even the export of Spiegel is less active, so that it is not easy to sustain the price of it. Forge Pig is lower; there are no orders beyond the third quarter. The Pig-iron situation at Siegen is deplorable; soon more blast furnaces will have to be blown out in the locality. Siegen is unfavorably situated compared with Westphalia, and now the railroad freight changes are going to operate against it in a disastrous manner. Luxembourg Pig at the low price at which it sells in a terrible competitor besides. Foundry Pig has also gone on drooping. Even Bessemer and Thomas sell less readily. Spiegel with 10 @ 12 % Manganese is selling at 45 @ 46.50. Finished Iron is offered lower than there seems to be any cause for. Some rolling mills are busy, others not. Thin Sheets are still depressed. Wire Rods are more neglected than ever; prices obtainable will not leave the maker whole. The export trade therein has ceased almost altogether. There are but rarely adjudications for Railroad Material, and the latter is in a poor plight. But a few machine shops and foundries have sufficient occupation. In Upper Silesia the stock of Pig iron decreased but 300 tons in all July; at this rate it would take a year and a half to absorb the load under which that region is groaning. As the export to Russia cannot be relied on, some blast furnaces will soon have to be blown out. Finished Iron is selling there at ruinous figures. A brisker demand is now setting in, however, and prospects for the fall trade are improving. Metals—Are, dull and unchanged.—*Borsenhalle.*

HOLLAND.
ROTTERDAM, August 19, 1886.—Tin—has been neglected; at the same time it is offering sparingly. For Banca, spot, 90.25 guilders is asked. Biliton, September delivery, sold at 90.75; for December, 90 @ 90.25 is asked.—*Koch & Vierboom.*

SPAIN.
BILBAO, August 18, 1886.—Iron.—There has been greater animation in Iron Ore without so far leading to any improvement. We quote Campana 6/ @ 6/3, and Rubio 6/3, after selling several cargoes at 5/9. The Ore lately shipped was in good condition. Freight is still depressed; for Cardiff and Newport, 8/4 @ 8/9, and for Glasgow, 4/3 @ 4/8. Shipments have so far this year reached 2,163,667 tons, against 2,020,569 in 1885.—*Revista Minera.*

AUSTRIA.
VIENNA, August 22, 1886.—Iron.—Although still rather quiet, the market in Austria, Hungary, exhibits great firmness. The syndicate of Bohemian and Moravian rolling-mill owners have advanced the price of Merchant Iron 1/4 florin per 100 kg. In Hungary Merchant Iron has also improved, but the decline in Silesia checks a further advance. Sheets and Beams enjoy a good demand everywhere. We quote Pig 49 florins per ton; Merchant, 117.50 @ 122.50; Sheets, 140 @ 175, and Beams, 105 @ 110. Metals—Have been moderately active and steady. We quote Copper, 51.50 @ 53; Lead, 17.50; Spelter, 18.10; Tin, 130 @ 131; Antimony, 37, and Quicksilver, 230 florins, all per 100 kg.—*Austrian Trade Journal.*

CHILE.
VALPARAISO, July 9, 1886.—Copper.—Sales during the fortnight embraced 19,500 quintals at \$17.30 @ \$17.45, exporters not being anxious to operate in view of the unsettled London market. The price of 17.30 equals \$29.27 in London. Nitrate.—Advice from abroad being unfavorable, while makers did not feel disposed to make concessions, sales have been restricted to 67,000 quintals at \$3.314, 25 c, which equals 5/3 in Liverpool. June shipments were 2,900 tons to Europe and 14,700 to the United States; loading, 24,700 tons for Europe and 3900 for the United States; charters since June 25, 19,800 tons for Europe. Coal has continued to improve, and Newcastle, West Hartley, now commands 37; Australian, 22; Smelling Coal, 18; Exchange has been steady at 22 1/2.—*Weber & Co.*

EAST INDIES.
COLOMBO, July 22, 1886.—Rubbish.—The market has been steady with a moderate business doing. We quote: Large Lumps, 142.10 rupees per ton; Ordinary Lumps, 125; Chips, 75 @ 87.50, and Dust, 45 @ 55. Total shipments to date, 145,341 cwt., against 159,246 in 1885, 154,105 in 1884, and 207,725 in 1883. This year's shipments have been 55,700 cwt. to England, 44 to Mauritius, 1294 to Havre, 514 to Rotterdam, 5465 to other Continental ports, 149 to India, 1011 to Australia and 81,526 to the United States. Exchange, six months' sight, 1/5 1/2.—*Volkart Brothers.*

Locomotives tend daily to become more costly, because they are daily augmenting in weight. The public demand roomy cars, and their weights increase rapidly with their size. The proportion of dead weight to paying load in passenger trains is now greater than it ever was, and the locomotives must be made to comply with the altered conditions.

Condition of the Blast Furnaces of the United States, September 1, 1886.

The most striking feature of the returns which reflect the status of the blast furnaces of the United States at the beginning of the current month is that there have been no additions of consequence to the list of active furnaces. Reviewing the history of the past few months, we may state that all the fluctuations in the status of the anthracite furnaces are merely those due to the blowing out temporarily for repairs. In over 100 furnaces it may happen that at a given date a few more are blowing, and only a week later there may be a considerable change, and yet it does not follow that there has been a resumption of work among idle furnaces or a blowing out of active ones to wait for better times. This month, it will be noted, there is quite a heavy decline in the number and in the capacity of the plants running with anthracite as a principal fuel, and yet, so far as we can learn from a study of the details, this does not in reality represent a restriction of the output which is likely to last. The furnaces which have gone out will blow in again, and some which have been repairing will resume operations during the current month. Still August has borne out the prediction made a month since concerning the probability of a light month, and we are justified in stating that September will be even smaller still. In ordinary times, with a fair stock acting as a fly-wheel, such a state of affairs would not be likely to have any appreciable effect upon values, but when consumption and output are so closely balanced as they have been for months, and when the quantities available from other sections are below the average of the past six months, even a temporary reduction of the supply is likely to have its influence. It is to guard against exaggerated ideas of that reduction that we insist upon the statement that everything points to a probable return to the output of past months. It happens that a number of furnaces have blown out for repairs, while the gap made has not been at once filled by others which were getting ready to resume.

Anthracite Furnaces in Blast September 1.

Location of furnaces.	Total number of stacks.	Number reported in blast.	Capacity per week.	Number reported out of blast.	Capacity per week.
New York.....	30	14	3,801	16	3,490
New Jersey.....	15	7	2,359	8	1,870
Spiegel.....	3	3	255	0	0
Pennsylvania:					
Lehigh Valley.....	47	35	10,806	12	3,056
Schuylkill Valley.....	45	19	5,658	26	6,480
U. Susquehanna Val.....	30	10	3,570	10	1,815
L. Susquehanna Val.....	37	32	7,953	5	3,440
Maryland.....	4	1	300	3	440
Total Sept. 1.....	302	113	33,937	90	20,611
Total August 1.....	312	130	36,841	92	20,549
Total July 1.....	311	117	36,702	94	20,509
Total June 1.....	312	121	38,289	91	19,949
Total May 1.....	308	116	36,924	89	19,565

No special changes have taken place in New York. We have, however, dropped from the list a number of the furnaces not likely to resume. In New Jersey the Chester Furnace will blow in this month, and then the output of the State will return to its nominal magnitude. In the Lehigh Valley the Macungie and one of the Saucon furnaces have blown out for repairs. In the Schuylkill Valley the Leesport, the Mount Laurel and Robesonia furnaces have gone out, while the Lucinda will soon blow in, to make spiegel. In the Upper Susquehanna Valley one of the Lackawanna furnaces has gone out for repairs. The Danville furnaces have been purchased by the North Branch Steel Company, but as yet no plans have been settled concerning them. In the Lower Susquehanna Valley one of the Chestnut Hill furnaces has gone out of blast, and the same is true of one of the Chickies furnaces, which is to be replaced by a new 65 x 12 stack. The Katharine Furnace had just gone into blast.

The following is a summary of the status of the bituminous and coke furnaces of the United States on the 1st of August, from which it will be seen that there is a slight increase in the make:

Bituminous or Coke Furnaces in Blast, September 1, 1886.

Location of furnaces.	Total number of stacks.	Number reported in blast.	Capacity per week.	Number reported out of blast.	Capacity per week.
Pennsylvania:					
Pittsburgh.....	16	14	13,475	2	1,300
Spiegel.....	1	1	495	0	0
Allegheny Valley.....	2	1	1,015	1	115
Shenango Valley.....	13	6	6,901	7	4,370
Yough Valley.....	6	3	1,078	3	855
Junata & Conemaugh.....	30	10	4,505	10	3,012
Spiegel.....	1	1	250	0	0
Virginia.....	2	1	130	1	80
Maryland.....	10	8	2,380	2	780
West Virginia.....	6	4	1,870	2	780
Ohio:					
Mahoning Valley.....	15	11	6,025	4	2,280
Hocking Valley.....	15	6	1,078	9	1,350
Hanging Rock.....	18	10	2,025	8	560
Miscellaneous.....	13	14	6,496	5	2,310
Kentucky.....	3	3	895	0	0
Tennessee.....	10	8	2,970	2	625
Georgia.....	3	3	815	0	0
Alabama.....	3	1	125	1	210
Indiana.....	16	11	9,978	5	1,890
Illinois.....	3	0	0	3	380
Michigan.....	3	0	0	3	1,625
Wisconsin.....	3	1	440	2	350
Colorado.....	1	1	675	0	0
Total Sept. 1.....	306	185	69,306	71	23,032

As compared with former months we have:

	Furnaces in blast.	Capacity per week.
September 1.....	185	69,306
August 1.....	183	68,502
July 1.....	182	71,316
June 1.....	180	70,760
May 1.....	179	67,888

In the Pittsburgh district all but the Ella and one of the Schoenberger furnaces are running. A report that the Isabella has been showing signs of chilling and will therefore soon go out is contradicted. In the Shenango Valley one of P. L. Kimberly & Co.'s Etna furnaces has been blown out since the 1st, but their new furnace will go in in a few days. Henderson Furnace, purchased by the recently organized Henderson Furnace Company, of Sharpsville, has blown in, and the Keel Ridge Furnace resumed in August. Generally speaking the Shenango Valley furnaces have not been producing quite as much in August as in previous months. In the Youghiogheny Valley the same stacks were running, to which is to be added the Oliphant, which, it is expected, will resume on the 10th of October. In the Juniata and Conemaugh valleys the Emma and Powelson furnaces have gone out for repairs.

In Virginia the Lynchburg furnace resumed operations on the 12th of August, while in West Virginia the Irondale, remodeled to 60 x 13½, was lighted again on the 7th, making about 30 tons a day. In the Mahoning Valley the Girard Furnace is out. No changes of consequence have taken place in the Hocking Valley, Ohio. Among the furnaces classed under "miscellaneous" in Ohio the Bellaire will go in in a few days, and the Steubenville Furnace, which was idle since May last, blew in on the 3d inst., so that the output of Ohio will be heavier in September than it was in August. The same furnaces are running in Kentucky and in the Southern district. In Illinois the Calumet Furnace will be in a few weeks, and in Missouri the second of the furnaces of the Western Steel Company has been blowing during the last week in August.

We summarize the status of the charcoal furnaces as follows:

Charcoal Furnaces of the United States, September 1, 1886.

Location of furnaces.	Total number of furnaces.	Number reported in blast.	Capacity per week.	Number reported out of blast.	Capacity per week.
New England.....	14	7	710	7	314
New York.....	10	1	480	9	380
Pennsylvania.....	37	5	43	32	430
Maryland.....	18	4	196	14	640
Virginia.....	24	4	100	20	1,040
North Carolina.....	2	1	130	1	190
West Virginia.....	3	0	0	3	165
Ohio.....	15	7	400	8	665
Kentucky.....	8	3	305	5	110
Tennessee.....	8	8	510	0	170
Georgia.....	11	8	1,975	3	145
Alabama.....	25	15	4,144	10	2,060
Michigan.....	11	3	652	8	725
Wisconsin.....	1	0	0	1	210
Minnesota.....	1	0	0	1	452
Missouri.....	4	2	475	2	190
Texas.....	1	0	0	1	345
California.....	1	0	0	1	175
Washington Ter'y.....	1	0	0	1	100
Oregon.....	1	0	0	1	100
Total, Sept. 1.....	181	68	10,797	113	8,771

As compared with former months this is:

	Furnaces in blast.	Capacity per week.
September 1.....	68	10,797
August 1.....	63	9,725
July 1.....	61	9,863
June 1.....	61	9,967
May 1.....	45	8,311

There has been, therefore, a slight increase in the number and capacity of charcoal furnaces blowing. We estimate the output of Michigan, based upon nearly complete returns, at 17,774 gross tons for the month of August.

We estimate the output of these districts as follows for the first eight months:

Production of Anthracite Pig Iron, Eight Months, Gross Tons.

Pennsylvania—	364,681
Lehigh Valley.....	306,227
Schuylkill Valley.....	99,496
Upper Susquehanna Valley.....	286,159
Lower Susquehanna Valley.....	181,416
New York.....	89,912

The estimate of the actual output of the bituminous and coke furnaces will be given in our next issue.

While a good deal of fun has been poked at our vessels of war and every new venture in the Government shipbuilding line has been bitterly criticised, it is somewhat consolatory to turn to the results of investigations in foreign Government departments. In a general way European powers seem to enjoy, or have enjoyed, according to popular opinion, comparative immunity from the dishonest practices and lack of thoroughness which characterize Government work in so many branches in this country. This illusion, however, will speedily vanish when the facts in the cases are known. Taking the work of the Navy Department as of special interest, attention may be given very appropriately to British Admiralty practices which, for obvious reasons, we might be expected to regard as examples worth imitating. All available reports, however, present them in a most unfavorable light, and they will apparently be valuable only through the experience to be gained from them, and not because of any results of immediate benefit. Light weight for a given amount of power and great compactness are prominent features of the British man-of-war engine of the present time, and in securing them the requirements of general efficiency seem to have been seriously neglected. This, at all events, is the impression which an examination of the records of British war-

ship trials and of the behavior of the vessels under ordinary circumstances will make. Though the engines of the vessels may to all outward appearances give every satisfaction during the customary six hours' full speed trial, there is no guarantee whatever that they are capable of exerting this maximum effect for any great length of time without trouble. This has already been shown to be true to a certain extent by practical test, and requires little further confirmation, though prolonged trials giving every opportunity for fairly judging the machinery from this particular point of view would be of the utmost interest. At the same time, however, it is an admitted fact that the engines of the vessels are taxed to the extreme limit of their endurance by the trials to which they are now subjected, and are able to satisfy the imposed conditions only by the most careful handling. In other words, then, the ships are fitted with engines which can be worked up to maximum power for only a few hours, and are thus not by any means what they ought to be or what they are generally believed to be. The machinery, as one of the English papers complains, is called upon to achieve impossibilities, and the British authorities either do not know or do not care that they are impossibilities. These facts, and such they are beyond a doubt, deserve the closest attention and ought to be of some service in suggesting possible and desirable modifications in the designs of engines which should be capable of meeting every demand for absolute reliability and continuous thorough working at the high speeds claimed for them. That success in this respect has not been realized in the British navy is well attested by the several break-downs of which we do know, and by many others which have undoubtedly occurred, but of which little, if any, knowledge is allowed to reach the public.

The great damage to the city of Charleston by the recent surprising earthquakes is peculiarly to be regretted, for the reason that the damage can never be made good nor the losses replaced. Much that is destroyed or irreparably injured belongs to the past, and no commercial or social necessity exists for its replacement. Old mansions, old churches and public buildings of a period antedating the great changes of the war are the ones most damaged, and they are not likely to be rebuilt. This fact may well occasion regrets, but it is also a source of some satisfaction, since a very large part of the estimated total loss is represented by the damage to buildings which will not need to be replaced. Meanwhile, however, it must be remembered that there is an immense amount of suffering resulting from the great calamity, that a multitude of people are homeless, and that the prosperity of the city has received a staggering blow. As soon as the requirements of the community are fully understood we have no doubt the response from all parts of the country will be immediate and hearty. The people of Charleston are showing a most commendable spirit, and are asking for nothing but the temporary accommodation of tents to shelter the homeless. It is not likely, however, that this spirit of self-helpfulness will be misunderstood and lead to the withholding of necessary help. It is rather likely to stimulate wisely-directed charity and to commend the hearty sympathies of those who have resented evidences of absolute dependence upon outside aid. The frequent recurrence of the phenomena so much dreaded, showing that mysterious and immeasurable disturbing forces are still at work, is well calculated to utterly dishearten the afflicted community and discourage all efforts to restore the city, but the people of Charleston do not seem to have lost heart, and in their struggle with adversity they are entitled to all the generous help they need.

The Causes of Commercial Depression.

A valued correspondent sends us the following communication, which will doubtless be read with interest:

To the Editor of The Iron Age.—DEAR SIR: The French economist, Emile de Laveleye, has expressed his views as to the causes of the present crisis in a recent number of the *Contemporary Review*. The distinguished reputation of M. de Laveleye as a publicist and statistician gives peculiar interest to his opinions at the present time, and besides the arguments he presents, supported by convincing statistics, seem unanswerable as an explanation of the economic situation. The principal cause of the prevailing distress, he asserts, is the excessive fall in prices, and he then proceeds to inquire what has produced the extraordinary and unprecedented depression of prices. Of course several agencies have contributed to this result—overproduction, the entire collapse of special industries—but these are merely local and do not explain the condition of trade in every country of the world. The true cause is found in the ever-growing scarcity of gold and the monetary contraction thence resulting. In 1869 it was asserted by the economist that the annual supply of gold at that time—\$150,000,000—was barely sufficient to meet the requirements of the expanding commerce of the world. Since that time commerce has gone on increasing from year to year, while the annual supply of gold from the mines of Australia, California and elsewhere has fallen to less than \$90,000,000.

The adoption by Germany of the gold standard in 1872 absorbed from general circulation a large quantity of gold, and should the United States follow its example, as has

been proposed, the effect upon commerce all over the world would be disastrous in the extreme. It is suggested that the most fortunate occurrence at the present crisis would be the discovery of large deposits of gold. Such discoveries in the past have always had the most beneficial effects on trade, being followed by increased prices and greater activity. Some writers have denied that increased production of gold has this result, on the ground that while production rose, as it did between 1850 and 1870, 200 per cent., prices only rose about 15 or 20 per cent. But this is explained by the fact that such an impetus was given to railroads and international commerce in general that ample employment was found for the gold. With the same volume of business as was previously transacted there would have been an extraordinary boom in prices. Lord Beaconsfield said in 1879 that gold was steadily appreciating in value; as it continued to appreciate the lower would prices become. The argument is that as the increase in the supply of gold raises prices, so a decrease in the supply lowers prices. It is not at all difficult to understand why this should be so. The supply of gold for money being insufficient, in countries where silver is proscribed currency is rapidly going to a paper basis. In the United States the tendency is toward silver.

The maintenance of the present unequal relation between silver and gold is undoubtedly the cause of much of the uncertainty feeling on the part of investors and business men generally. Nominally we have a double standard of value, but the difference between the actual value of the silver dollar and the value of the gold dollar must result in withdrawing the latter from circulation and placing the finances of the country exclusively on a silver basis. This would without doubt be advantageous to the European countries, as it would increase the supply of gold for circulation there by lessening, if not destroying, the demand in this country. But the effect of such a condition of affairs would be extremely injurious to us, as the experience of other countries has shown that a "low standard of value places the nation that adopts it at great disadvantage in its trade with other nations, and at the same time and consequently depresses its own industries." There is an idea that cheap money stimulates commerce, but that proposition has been disproved over and over again.

There is nothing more damaging than the fluctuations of value which arise from the present system. Men are afraid to take hold of any enterprise which involves the outlay of capital, and wages are bound to be affected by this uncertainty. The supply of gold being too limited to supply all the needs of circulation, it is, of course, necessary to employ silver in the facilitation of exchanges. But the silver dollar should be made to approximate the value of the other standard—the gold dollar. Where prices are reckoned by the dollar, and the gold dollar and the silver dollar are made by arbitrary law equal in value for the purpose of exchange, the effect on purely domestic business is not, perhaps, so important as long as the silver dollar is freely received. But when it comes to the settlement of international balances the owner of the silver is placed at a great disadvantage, as the foreign creditor only recognizes the bullion value and must be paid in gold. One plan has been proposed to steady the value of silver which seems to have considerable merit. It is proposed to issue certificates against bullion deposits of silver with the Treasury, the holder of the certificate being entitled to the gold value of the bullion either when he presents the certificate for redemption or the market value at the time when the certificate was issued. It is not believed that the fluctuation of value would be so great as to cause any appreciable loss either to the Government or to the holder of the certificate.

Hugh McCulloch, ex-Secretary of the Treasury, in a letter written to the bankers' convention recently held at Boston, advocates as essential to the return of financial prosperity the suspension of the silver coinage for an indefinite period, the discontinuance of the issue of notes under \$5 and a recoinage of a part of the dollars now in the Treasury into fractional pieces. He is inclined to think that the present depression is due to overproduction, "because the supply is greater than the demand, because the revolution in all branches of industry caused by machinery is now felt in full force."

[Comments by the Editor.]

Our correspondent discusses in a rather comprehensive way a very complicated question. Gold being the only true and accepted standard of values in the leading commercial countries, its greater or less abundance at any given time must, of course, affect values. So also a gold drain which causes a large amount of the metal to be forever withdrawn from circulation—as in British India, for example, where £4,712,899 have been absorbed annually during the past five years—must affect prices to an appreciable extent. But that the decreased supply of gold is the chief cause of the decline in values—a theory first propounded by Mr. Goshen, in London—we do not believe. We attribute it rather to the immensely increased and cheapened production of recent years. If to the scarcity of gold these phenomena are attributable, real estate values, both urban and rural, would have declined in value proportionate to the decline in commodities; yet the value of land has been maintained wherever it has value. The recent advance in wool and the still more recent advance in coffee show that the moment consumption reaches the proportions of the supply in any stable article of utility the tendency is the same as it has always been—a legitimate advance is established and speculation runs prices up as high as ever. So far as our own monetary system is concerned, we do not think it can be discussed more intelligently than it was by Mr. Hugh McCulloch in the recent National Bankers' Convention.

The new co-operative glass works being erected by glass-workers from Pittsburgh will be completed and in operation in November next.

WASHINGTON NEWS.

(From Our Regular Correspondent.)

WASHINGTON, D. C., September 7, 1886.

The circular of transfer of the Washington Navy Yard from the old arrangement of divided bureau control, which has lasted for 85 years, to the uses of the Bureau of Ordnance inaugurates not only an enlarged sphere of activity, but will make Washington the headquarters for the fabrication of naval ordnance. The transfer will take place on October 1. In anticipation of the event the ordnance officers of the navy have been perfecting their plans and examining appliances for the manipulation, assembling and completion of high-power improved guns. For some time the navy-yard at Washington has been engaged in the manufacture of naval supplies, and has successfully fabricated out of domestic steel tubes 6 and 8 inch naval ordnance of the patterns adopted for the use of the new ships of the navy. This practically experimental work demonstrated the advantages of the Washington yard for the purposes indicated, and led to the change. The enlarged plant will embrace overhead cranes, lathes and assembling machinery of increased power, so that guns of the largest caliber may be handled. From the 12-inch gun it is proposed to advance to 16 and 18 inch bore. Plans have been perfected so as to enable by means of machinery the completion of a gun without rehandling after the band jacket and rings are placed on the tube and it is placed on the lathes. This will include rifling and external finish.

The ordnance officers at the Navy Department are feeling quite encouraged over this opportunity to display their ingenuity and skill in the design and manufacture of naval ordnance, which they claim in present small and future large calibers will lead the best ordnance of the European nations. The appropriations for naval ordnance in general in 1885 were but \$125,000, but for the armaments of the four steel cruisers \$300,000 were appropriated. This liberal sum was for high-power steel guns; secondary batteries, which include the Hotchkiss and Gatling guns; steel gun carriages, with steam appliances for handling the gun; new powder, shot and shell, and improved small arms. This in itself will keep the officers at work until they are prepared to go on with the armaments of the additional vessels ordered. Hitherto the 6-inch tubes have alone been of domestic manufacture, the 8-inch being imported. The American manufacturers can now produce the larger size, and with proper encouragement there will be no difficulty in turning out tubes of home manufacture of any required size. It is claimed for the new ordnance authorized that the guns will be of American design, possessing all the best features of advanced foreign ordnance, with such improvements as the ingenuity and skill of our own officers suggest.

The designs of 12 and 16 inch guns have been completed, and only await the necessary forgings to begin work. The appropriation for the work will be available as soon as the Secretary of the Treasury returns.

THE TESTS OF NEW ORDNANCE.

In speaking of the tests of the 8-inch naval guns the officers in charge say that the results were most gratifying. The naval ordnance proving ground at Annapolis has every facility for work. The guns showed 1956 feet initial velocity. This gun will throw a projectile weighing 250 pounds 8 miles with a charge of 125 pounds of powder. It has been demonstrated by experiments that these high-power guns of the future will place any seacoast city at the mercy of a fleet unless adequate means of resistance are presented. It is stated that a fleet off Sandy Hook with ordnance already practicable could land 800-pound shells anywhere within a radius of 16 miles. The only effectual resistance now known or suggested is steel towers and floating batteries off the coast to keep a fleet beyond the line of range of projectile. It has been demonstrated that the old-style granite forts or earthworks for seacoast defense are practically useless. The wars of the future will depend for success not only on the advancement in warlike appliances, but upon the weight and quality of metal. From a defensive point of view the consumption of steel for warlike purposes will in the near future approximate even the yearly increasing demand for the arts of peace.

HIGH-POWER SMALL ARMS.

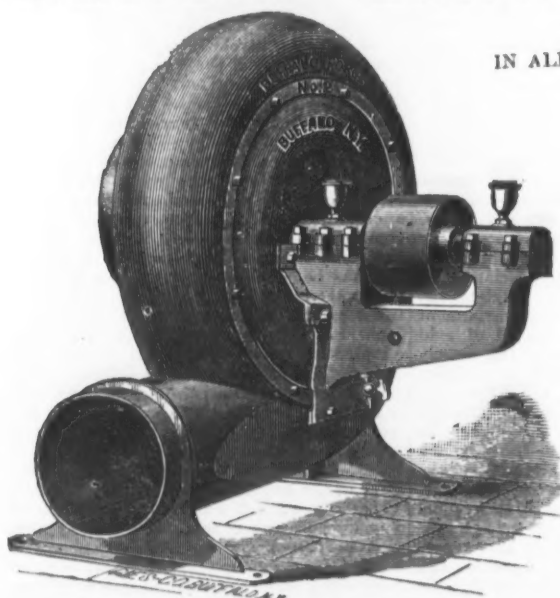
In addition to high-power heavy guns, the ordnance officers of the navy have designed a high-power small arm for picking off gunners behind the steel shields which are necessary as a protection against the rain of shot from the secondary batteries. The small arm will within close-quarter range throw a small steel bolt which will penetrate 2 inches of steel. The experiments with these small arms, which are breech-loading, have been entirely satisfactory.

The American heavy guns which have been adopted for naval use are a modification of the Vavasseur, which is claimed to be the only true design of a steel gun. The naval gun is fitted with a slotted screw breech, while the Krupp gun has a sliding wedge breech. The American is considered a great improvement in celerity of manipulation and safety over the German gun.

MACHINERY FOR HANDLING GUNS.

In addition to the steam training engines by means of which heavy ordnance will be handled in action, experiments are in progress looking to the use of electric motors which will supplement steam in case of accident or damage. The guns can also be managed by hand in event of stoppage of all other means of working them. Under the last act of Congress for new vessels \$1,000,000 were appropriated for their armaments. It was observed by a naval authority that it took more time to construct the armament than to build the vessel. The work on the guns of the additional ships will therefore begin immediately after the transfer of the Washington Navy-Yard to the Ordnance Bureau.

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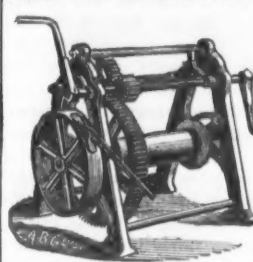
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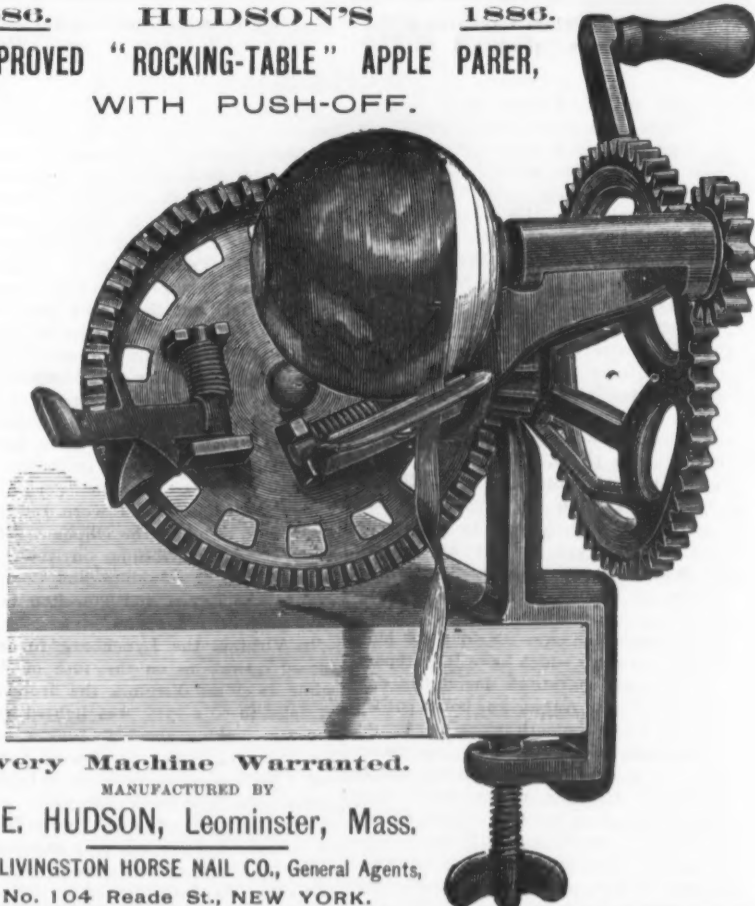
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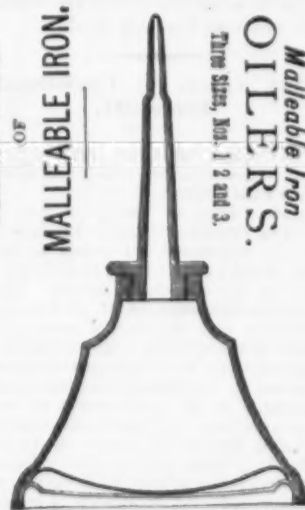
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Tucker & Dorsey Mfg. Co., Indianapolis, Ind.	32
Salom & Weller, Philadelphia, Pa.	5
Anti-Friction Metals	
Reeves Paul S., Philadelphia, Pa.	44
Anvils, Manufacturers of	
Eagle Anvil Works, Trenton, N. J.	42
Apple Parers	
Reading Horse Nail Co., 101 Reading, N. Y.	16
Reading Iron Works, Reading, Pa.	12
Arms and Ammunition	
Stevens Arms and Tool Co., Chicopee Falls, Mass.	34
Asbestos	
Chalmers-Spence Co., 419 8th, N. Y.	9
Aspers and Bits	
Bridgeport Gun Implement Co., Bridgeport, Conn.	28
Johnings C. E. & Co., 90 Chambers, N. Y.	28
New Haven Copper Co., 294 Pearl, N. Y.	2
Axles, Springs, &c., Manufacturers of	
Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.	36
Laggett Spring & Axle Co., Pittsburgh, Pa.	36
Wurster F. W., Brooklyn, N. Y.	44
Axes	
Francis Aze Co., Buffalo, N. Y.	28
Peck A. G. & Co., Cohoes, N. Y.	44
Habbit Metal	
Ray W. L. & Co., Elkhart, Ind.	40
Band Saws	
Pratt P. 167 W. 40th st., N. Y.	40
Bankers	
Gallagher P. W. & Co., 2 Wall, N. Y.	13
Bar Iron	
Virginia Nail and Iron Works Co., Lynchburg, Va.	16
Barb Wire	
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.	3
Iowa Barb Wire Co., Burlington, Vt.	3
McDon Iron & Steel Co., Burlington, Vt.	3
Thorn Wire Hedge Co., Chicago, Ill.	3
Washburn & Moen Mfg. Co., Worcester, Mass.	3
Belted	
Bullock T. H., Cleveland, O.	16
Scott Geo. M., Chicago, Ill.	16
Bells	
Barton Bell Co., East Hampton, Conn.	10
Chapman Bell Co., Meriden, Conn.	10
Bells (Steel)	
Devlin Bros. Mfg. Co., Easthampton, Mass.	10
Belted, Makers of	
Alexander Bros., 113 N. 3d, Philadelphia, Pa.	28
Main setting Co., Philadelphia, Pa.	28
N. Y. Belting & Packing Co., 13 & 15 Park Row, N. Y.	13
Bicycles	
Pope Mfg. Co., 597 Washington, Boston, Mass.	44
Bird Cages, Makers of	
Heintz & Munschauer, Buffalo, N. Y.	10
Lindeman O. & Co., 254 Pearl, N. Y.	10
Maxwell John, 113 and 249 Pearl, N. Y.	10
Osborn Mfg. Co., 79 Ischester, N. Y.	40
Pierce Geo. N. & Co., Buffalo, N. Y.	40
Blasting Supplies	
Acton Powder Co., Chicago, Ill.	31
Blind Awaiting Fixtures	
North F. O. & Co., Boston, Mass.	43
Blocks, Tackle, Makers of	
Baggett & Co., Boston, Mass.	11
McMahon W. B., 113 South, N. Y.	11
Penfield Block Co., Lockport, N. Y.	11
Shubert & Cottinham, Philadelphia, Pa.	11
Bolter Plates	
Wm. McMillan & Sons, Reading, Pa.	41
The Siskel & Hastings Co., Wilmington, Del.	24
Bolters, Steam	
Backus & W. Co., 30 Cortlandt, N. Y.	30
Edgar Iron Co., Wilmington, Del.	30
Wetherill Robt. & Co., Chester, Pa.	43
Bolt and Rivet Clippers	
Chalmers, Brother & Co., Philadelphia, Pa.	43
Bolt Cutters	
Bowditch Iron Works, Buffalo, N. Y.	41
Sellers Wm. & Co., Philadelphia, and 79 Liberty, N. Y.	41
Wiley & Russell Mfg. Co., Greenfield, Mass.	44
Bolts	
Ives W. A. & Co., New Haven, Conn.	44
Saxton & Osmond, Buffalo, N. Y.	44
Bolts, Manufacturers of	
Amoson Brass & Copper Co., 19 Cliff, N. Y.	44
Bridgeport Brass Co., Bridgeport, Conn.	44
David John & Sons, 100 John, N. Y.	2
Holmes, Booth & Hayden, 25 Park, N. Y.	2
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Boiler Plates	
Boilers, Steam	
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Edgar Iron Co., Wilmington, Del.	30
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David John & Sons,	

Trade Report.

New York.

American Pig.—So far as the happenings of the week are concerned there is nothing to report. One of the largest companies has during the past few weeks taken a number of round blocks, and has now sold its entire output for the year. While no striking events have occurred to cause a sudden change of feeling, it may be stated that the conviction is gaining ground that when the time comes for closing next year's contracts an increased price will be demanded by sellers and conceded by buyers. Almost imperceptibly the market has been drifting in that direction, and if the features which are now shaping it—viz., a growing consumption, light stocks and little reserve in the way of available capacity—continue, a moderate advance seems certain. There is room for it without opening the floodgates for Foreign Iron, and the well-known conservatism of those at the head of affairs of our leading producers is a guarantee that no injudicious movement will be attempted. We quote standard brands Foundry No. 1, \$18 @ \$18.50; No. 2, \$17 @ \$17.50, and Gray Forge, \$15.75 @ \$16.25.

Scotch Pig.—There is nothing of special interest to report. We quote nominally as follows for small lots: Coltness, \$20 to arrive; Gartsherrie, \$19.50 to arrive; Shotts and Langloan, \$19.50 @ \$20 to arrive; Carnbroe and Glengarnock, \$19 to arrive; Summerlee, \$19.75 to arrive; Dalmellington, \$19 to arrive; Eglington, \$17.75 @ \$18 to arrive, and Clyde, \$19 to arrive.

Bessemer Pig.—This market is dull at \$18.75 @ \$19 nominally for Foreign at tidewater, and \$18 @ \$18.25 for Domestic at furnace.

Spiegelisen.—We do not hear of any business and continue to quote English 20 % nominally \$25.25 @ \$25.50.

Bar Iron.—There has been no material change in the situation. Common Iron, 1.65¢ @ 1.70¢; Medium, 1.70¢ @ 1.75¢, and Refined Iron, 1.75¢ @ 1.9¢.

Structural Iron and Steel.—There is a better feeling, which finds expression in a closer scrutiny of orders, a thinning of the ranks of low sellers and a disposition to ask an advance. As yet, however, better prices are not general enough to justify higher quotations. We quote, according to quality, for Angles 1.95¢ @ 2.10¢, delivered, and Tees at 2.35¢ @ 2.45¢, for round lots. Steel Angles are quoted 2.35¢ @ 2.45¢, according to quality. Store quotations remain 2.25¢ @ 2.4¢ for Angles, and 2.6¢ @ 2.7¢ for Tees. American Beams and Channels are nominally 3¢ base from dock for all orders.

Plates.—The majority of the mills are better supplied with orders than they have been for a long time, and many of them are asking higher prices. We quote for round lots: Common or Tank, 2.10¢ @ 2.20¢; Refined, 2.2¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.25¢ @ 3.3¢; Flange, Extra, 4¢ @ 4.1¢. For small lots of Steel Plates the quotations are as follows: Tank, 2.70¢ @ 2.75¢; Ship, 3¢; Shell, 3.1¢; Flange, 3.1¢, and Fire-Box, 4¢ @ 4.1¢, on dock.

Merchant Steel.—We quote nominally for the range of ordinary to good grades as follows: American Tool Steels, 7 1/2¢ @ 9¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; English Tool, 13¢ @ 15 1/2¢; common grades, 7¢ @ 9¢; Crucible Machinery, 3.75¢ @ 4.50¢. The Steel Association quotes base prices: Round and Flat Spring, 2.6¢; Round-Edge Tire, 2.3¢; Square-Edge Tire, 2.5¢; Toe Calk, 2.4¢; Sleigh Shoe, 2.2¢ @ 2.5¢; Open-Hearth Machinery, 2.5¢, and Bessemer Machinery, 2.5¢.

Steel-Wire Rods.—There has been some inquiry for spot lots, which it has been difficult to cover. It is reported that August sales of Plain Wire have been very heavy. We quote for early shipment Foreign Rods, \$37 @ \$37.50, and for later deliveries \$36.50.

Steel Blooms.—There is considerable talk of business, but we have been unable to trace it to any authentic source. Higher prices are asked for Blooms, say \$26.50 @ \$27, which makes it impossible to produce Rails from them at present prices.

Steel Nail Slabs.—We hear of considerable business during the past week at \$28 @ \$29 at tidewater.

Steel Billets.—Higher quotations are being made, \$27.50 @ \$28.50 being asked for 4-inch Billets.

Steel Rails.—It is reported that considerable business has been placed during the past week, among the contracts being one of 10,000 tons for the Erie Railroad. The representative of the Edgar Thomson Works authorizes the denial of the statement published in the Pittsburgh newspapers that the Chicago, Burlington and Quincy order has been placed there. There is considerable inquiry for 1887 delivery, which may be quoted \$33.50 @ \$34, while 1886 delivery commands \$34 @ \$35. We hear of no sales of Foreign Rails.

Steel Scrap.—We hear of a sale of 1000 tons of Foreign Bloom and Billet Ends at private terms. We quote for this class of material \$19.25, tidewater.

Leaf Spring Steel.—There has been some inquiry and some business lately. We quote \$20.50.

Old Rails.—The improved tendency continues, there being considerable demand in the aggregate for early delivery, with little available, the bulk of the stock being held for higher prices. We hear of the sale of a 3000-ton lot in Florida. A number of offers have been cabled abroad, but there is considerable difficulty about securing freights. Cables quote 56/, with little available at that. In this market \$27 is bid for T's and \$22 for D. H.'s in store.

Rail Fastenings.—We quote 2.25¢ @ 2.40¢ for Spikes, delivered, and 1.85¢ @ 2¢ for Angle Fish Bars.

Philadelphia.

Office of The Iron Age, 230 South Fourth St., PHILADELPHIA, September 7, 1886.

Pig Iron.—There is no change to notice, the demand being of the same character as noted for many weeks past. Large sales are seldom heard of, for the reason that contracts made during the first half of the year are still uncompleted, so that as yet there has been no necessity for renewing them, while the outlook is not such as to encourage either buyer or seller to discount the future to any great extent. The attitude is therefore a waiting one, and the demand from day to day regulated by the immediate requirements of the buyer. It cannot be said that the market has either gained or lost anything of late; some are a little weak, perhaps, but they are few in number and offset by others who are firm at full quoted rates. The very large output of Pig Iron has been an effective barrier against anything like an advance, and as the indications do not point to any disproportion between supply and demand there is no apparent reason for any change in prices. It may be remarked, however, that there is an undercurrent of strength which might rapidly develop into higher prices, providing something gave it a start. Higher prices have been so often predicted, and have so often failed to materialize, that people are afraid to express their opinions freely, although, as we have said, there is a lingering suspicion that the market may at any moment take on extraordinary strength and activity. Meanwhile, with a large production and an equally large consumption, it would require only a very slight gain in either one to decide the question of prices for some months to come. The chances seem to favor an increasing demand, as consumers of all classes are piling up orders, which will require a vast amount of material during the next three months. Developments will therefore be carefully watched, so as to take whatever advantages may be offered by being first in the market. Sales have been on about the basis of last week's prices, say \$18.50 @ \$19 at tide for No. 1 Foundry; \$16.75 @ \$17.25 for No. 2, and \$15.75 @ \$16.25 for Gray Forge. Slightly lower figures have been named on some brands, but on standard makes holders show great firmness, and absolutely refuse business unless on their regular terms. Special brands, as usual, command 50¢ @ \$1 premium, and are well taken up. Southern Irons are not offered at any price likely to attract bids; low prices, in fact, are the only inducement that consumers find in them.

Foreign Iron.—Prices are higher all around, but there is no demand except for Steel Blooms. Bessemer Pig is now quoted at \$19 @ \$19.50, and 20 % Spiegel at \$25.50, with no transactions since last week.

Blooms.—Foreign Bessemer Blooms for Rail purposes are now quoted at \$25.50, c.i.f., duty paid, but there is little chance of business at over \$24.50; Slabs for Nail Plate, \$27.50 @ \$28.50; Sheet-Iron Billets, \$29 @ \$30; higher qualities for Boiler Plate, &c., \$36 @ \$38; Charcoal Blooms, \$50 @ \$52; Run-out Anthracite, \$43 @ \$44; Scrap Blooms, \$34 @ \$35, and Ore Blooms, \$34 @ \$35.

Muck Bars.—Prices are firmer and at least 50¢ per ton dearer than they were a week ago. Sales have been made at \$28.25 @ \$28.50 at mill, and \$28.50 @ \$29 is now generally asked for a good quality of Bar.

Bar Iron.—There is a firmer feeling all around, and the general tendency is toward higher prices. The demand for Bars is not specially large, but the mills are so full of work on specialties that they have not much difficulty in running full, and as the Bar trade has been very unremunerative they naturally desire better prices, and particularly so in view of the increased cost of production. Some quote 1.9¢, but the range is from 1.8¢ upward, the average probably about 1.85¢, although they all talk higher prices, and it is not unlikely that some agreement will soon be made for a general advance to at least 1.9¢. Skelp Iron is still in demand, with bids of 1.8¢ @ 1.82 1/2¢ for large lots of Grooved and 2.10¢ @ 2.12 1/2¢ for Sheared, against 1.85¢ @ 1.90 and 2.15¢ @ 2.20¢ asked.

Plate and Tank Iron.—There is a very firm feeling in Plates, although new business has not been very plenty during the past week or two. The mills have a great deal of work on hand, however, and are therefore firm in the demand for higher, or at least full, quotations on anything they are called to bid upon. Prospects are considered to be entirely satisfactory, and there is a general opinion that as the season ad-

vances somewhat higher figures will be realized on almost all descriptions of Finished Iron. Meanwhile quotations are about as follows: Ordinary Plate, 2.05¢ @ 2.1¢, delivered; Tank, 2.1¢ @ 2.2¢; Shell, 2.5¢; Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Shell, 3.25¢; Flange, 3.5¢; Fire-Box, 4 1/2¢ @ 5¢.

Structural Iron.—A good average business is reported, but the strength of the market is in the large amount of work that is under contract for delivery during the balance of the year. In meeting this demand the mills are nearly all busy, so that the absence of new orders for a few days or weeks makes no material difference. Prices are firm at about the following quotations: 2¢ @ 2.1¢, delivered, for Angles; 2.15¢ @ 2.25¢ for Bridge Plate; 2.5¢ @ 2.6¢ for Tees, and 3¢ for Beams and Channels.

Sheet Iron.—There is not as much doing in Sheet Iron as was expected, and the feeling among manufacturers is one of disappointment. Prices are firm, however, and may be quoted about as follows:

Best Refined, Nos. 26, 27 and 28.....	3 3/4¢
Best Refined, Nos. 18 to 25.....	3 1/4¢
Common, 1/4¢ less than the above.....	
Best Bloom Sheets, Nos. 26 to 28.....	4 1/4¢ @ 5¢
Best Bloom Sheets, Nos. 25 to 26.....	4 1/4¢ @ 4 3/4¢
Best Bloom Sheets, Nos. 18 to 21.....	3 3/4¢ @ 4 1/4¢
Blue Annealed.....	2.6¢ @ 2.75¢
Best Bloom, Galvanized, discount.....	.005¢
Common, discount.....	.05¢

Steel Rails.—There is more inquiry for Rails, particularly from the West, and no difficulty in securing large orders at about \$34.50 at mill. The better feeling in foreign markets is reflected on this side, and buyers show more disposition to close contracts than they did a week or two ago. Prices range from \$34 to \$35 at mill, according to quality, date of delivery, &c.

Old Rails.—The market is hard to quote with exactness. There are buyers at \$21, Philadelphia, for good-sized lots; one of 500 tons sold at that figure, ex-ship, about due. Sellers quote \$22 in store for T's and \$22.50 for Bull Heads, but buyers do not respond to anything at much over \$21, f.o.b. The offerings are small, while the demand appears to be quite active for good American Rails.

Scrap Iron.—Demand active, with free sales at about the following figures: No. 1 Wrought Scrap, \$18.50; Selected do., \$20 @ \$21; No. 2 do., \$13 @ \$14; Turnings, \$14 @ \$14.50; Old Car Wheels, \$15 @ \$16; Old Steel Rails, \$20 @ \$21; Fish Plates in demand at \$24 @ \$25; Cast Scrap, \$14 @ \$15; do. Turnings, \$10 @ \$10.50.

Wrought-Iron Pipe.—The market is in a healthy condition and the demand very brisk. There is a scarcity of small sizes, caused by mills devoting their attention to large sizes, for which the demand at present is very strong. Prices are stiff, with plenty of business in sight, mills have all they can handle. Discounts as follows: Lap-Welded Black, 55 %; Butt-Welded Black, 42 1/2 %; Butt-Welded Galvanized, 32 1/2 %; Lap-Welded Galvanized, 37 1/2 %; Boiler Tubes, 50 %.

Nails.—There has been no perceptible increase in business during the past week, but there is some difference of opinion as regards the future. Notwithstanding the exceeding dullness prices remain firm, but if business does not improve soon lower prices are more than probable. For the present we quote \$2.20 from store.

John L. Hogan, 216 South Fourth street, Philadelphia, has been appointed Eastern agent for the sale of Sheet Iron and Steel made by the Falcon Iron and Nail Company, of Niles, Ohio.

Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, PA., September 7, 1886.

There has been no change in the general business situation since our last report; in some respects it is encouraging, while in others it is not. The Sable Iron Works, owned by Zug & Co., were partially destroyed by fire on Saturday evening last. Loss estimated at \$60,000, which is fully covered by insurance. The portions destroyed were the Muck rolls, Bar mill and some 10-inch Muck rolls. While we are not advised in regard to the matter, we presume the mill will at once be placed in running order again. It was working full at the time of the accident. The Nail factory was not injured; the latter has not been running for about 15 months. The railroads centering here continue to have about all they can do—more if they had the rolling stock which some of them have contracted for on a large scale recently. It is stated that all the car-building shops of the Pennsylvania Company are being worked up to their full capacity, and will be for a year or more to come. The reports from the West and South as regards business are generally of a most favorable character. Orders for nearly all kinds of manufactured goods are coming forward freely, and the outlook at present warrants the prediction that this will continue to be the case for some time to come. River navigation has been suspended by low water for several weeks, and according to present indications it is not likely to be resumed soon. There was a time years ago when the suspension of river navigation was a serious matter to Pittsburgh, but our railroad facilities are now so great that it is not near so important.

Pig Iron.—There has been a lull the past week, but this is easily explained. For several weeks preceding consumers generally bought pretty liberally, and having stocks sufficient to run them from one to three months, and with but little prospect of any immediate advance, it is not surprising that there has been a falling off in demand. It is also worthy of mention in this connection that as many of the furnaces are sold ahead the offerings to sell have also fallen off, and, notwithstanding trade is dull just now as compared with what it was a few weeks ago, the tone of the market, if anything, is firmer. Some furnaces are refusing to take any additional contracts at present prices. The offerings of Southern Iron have fallen off considerably, the effect of which has been to stiffen sellers, some of whom have hopes of realizing better prices before long; it is probable a better market for Southern Iron has been found elsewhere. We quote prices as follows:

Gray Forge Neutral.....	\$15.50 @ \$16.00, 4 mos.
White and Mottled.....	14.50 @ 15.00, 4 "
All-Over Mill.....	16.50 @ 17.00, 4 "
No. 1 Foundry.....	18.00 @ 18.50, 4 "
No. 2 Foundry.....	17.00 @ 17.50, 4 "
No. 3 Foundry.....	16.25 @ 16.50, 4 "
Charcoal Foundry.....	20.00 @ 20.50, 4 "
Cold-Blast Charcoal.....	24.00 @ 25.00, 4 "
Bessemer Iron.....	18.00 @ 18.25, 4 "

There have been no sales of Bessemer now reported for over a week; the last sales reported were at \$17.50 @ \$17.75, cash; it is said that there are now but few sellers at the inside quotations.

Muck Bar.—There is a fair business, but no improvement in prices, which we continue to quote at \$27 @ \$27.50, cash. We are advised of a sale at \$27.75, cash, but it was a special lot of a better quality than ordinary. Some of the mills are asking \$28, cash, but they are making no sales.

Manufactured Iron.—The activity noted for some time past continues; mills as a rule are busy, some of them working up to their full capacity, and the indications are that this will continue to be the case for some time to come. There is a very fair demand for all kinds of Merchant Iron, the best quality of which is quoted on a basis of 1.65¢ @ 1.70¢ for Merchant Bars, 60 days, 2¢ off for cash; Old Rail Iron, 1 1/4¢ @ 1 1/2¢ less. Skelp Iron is firmer, and some sellers claim to have realized an advance within the past week or two, while consumers allege that they are still able to buy at former prices. One mill is reported to have completed recently a contract for 4000 tons of Skelp Iron, and all those making it are very busy and unable to take all the business that is offered.

Nails.—Prices are still quoted at \$1.90, 60 days, 2¢ off for cash, in carlots and upward, for Iron Nails, and 10¢ @ 15¢ per keg additional for Steel. There is very little doing here aside from local trade; large buyers West and South aver that they are able to do better elsewhere, and as they are not buying here there is reason to believe that what they aver is correct. The factories here in Pittsburgh are all stopped; manufacturers say there is little or no margin at prices quoted, and that rather than make any concessions they will let their factories stand idle.

Wrought-Iron Pipe.—The activity noted for several months past continues, and it looks very much as if this would be the case until the close of the present year. This has been the most active year the Pipe manufacturers ever had, and there is no good reason apparent at present why next year should not be as good, if not better. Some people contend that the natural gas traffic, which is the great consumer of Pipe, is as yet in its infancy, in addition to which is the oil traffic and the general merchant trade. Prices firm, but unchanged. Discount on Black Butt-Welded Pipe, in carlots and upward, 45 %; Galvanized do., 35 %; Black Lap-Welded, 57 1/2 %; Galvanized do., 40 %; Oil Well Tubing, 52 1/2 %; 2-inch Oil Well Tubing, 14¢ per foot, net; 5 1/2-inch Casing, 45 %; net; 8-inch Drive-Pipe, \$1.30.

Steel.—This important interest continues much the same as noted for some time past; mills are pretty generally busy, but there is continued complaint in regard to prices. Standard brands of Refined Cast Steel, 8¢ @ 9¢; Crucible Machinery, 3 1/4¢ @ 4¢; Open-Hearth do., 2 1/2¢ @ 2 3/4¢; Bessemer Billets and Blooms still quoted at \$30 @ \$31; sale of 8-inch Square Billets at \$30. We are advised of a sale of 12.0 tons Steel Plates, but did not learn the price. Nail Slabs still quoted at \$29 @ \$30. No sales of Crop Ends or Bloom Ends reported for some time, in the absence of which we omit quotations.

Old Rails.—The market continues in an unsettled condition, and in the absence of sales it is difficult to give reliable quotations. Brokers generally say that they can get no offers to sell delivered here, under \$23 @ \$23.50, and buyers are refusing to pay the prices asked. Some lots on the market would cost \$24, delivered in Pittsburgh. Old Steel Rails may be quoted at \$22.50 @ \$23 for Long Lengths, and they are scarce. It is expected that they will be a good deal more plenty in a few years from now.

Steel Rails.—Heavy Sections are still quoted at \$36 @ \$36.50, cash, at mill. Mills here and elsewhere are sold for two to three months ahead, and it is very difficult to place orders for immediate or near-by delivery in consequence. Some are sold up until the close of the year.

Railway Track Supplies.—Prices remain unchanged. Spikes, 2.40¢, 30 days;

Splice Bars, 1.65¢ @ 1.75¢; Track Bolts, 2.75¢ with Square and 2.85¢ @ 3¢ with Hexagon Nuts.

Old Material.—There is a fair business, and prices are steady as quoted: No. 1 Wrought Scrap, \$18 @ \$19, net ton; Wrought Turnings, \$14 @ \$15; Old Car Axles, \$23 @ \$24; Cast Borings, \$12 @ \$13, gross ton; Cast Scrap, \$14 @ \$15; Old Car Wheels, \$16.50 @ \$17; Open-Hearth Steel, mixed lots, \$19 @ \$20, gross ton.

Chicago.

Office of The Iron Age, 36 and 38 Clark St., Cor. Lake St., CHICAGO, September 6, 1886.

The favorable conditions of trade continue to multiply as the season advances. Jobbers of all lines are now fairly started on sales and shipments for fall and winter goods. The first week of the month was quite satisfactory, and indicates that their full capacity will be reached. While prices are ruling steady, there are many complaints that they are profitless on some lines and too low on all. The earthquakes in the South were the only retarding incidents for the week, but too far removed from our market to affect trade except in sympathy.

Hardware.—The first days of September have brought out a vigorous demand for reasonable lines of Hardware. Shelf Goods, Window Glass, Light Tools, Cutlery, Tin Plate and Stamped Ware are in better request, while there was no decline in the demand for special fall and winter lines. More shopping is reported on the part of buyers, who come to the city to place orders largely on account of the firm prices that have been established in trade. Jobbers deviate from price lists less than at any time during this year, and manufacturers are decidedly firm on wholesale figures, but no changes of importance are announced.

Barb Wire.—There is very little demand for Fence Wire. The same conditions govern the market that have characterized it for weeks past, and it does not seem that there will be any change in the situation that will effect full trade. In small lots from store jobbers continue the quotation of 3 1/4¢ for Painted and 4¢ for Galvanized. Carload lots are quoted at 3¢ for Painted and 3 1/4¢ for Galvanized by makers and jobbers, though not maintained by brokers, who have no scruples in cutting prices to make sales. There has been no further action taken on the part of the Plain-Wire drawers regarding prices, and it is not likely that anything they could do would remedy the present weak and irregular market. During the week there was perhaps a little better trade in large lots, which brought out plenty of sellers at the best price obtainable. The quotation last week, 3 1/4¢, as makers' price for Galvanized Wire should have been 3 1/4¢.

Nails.—Quotations from store have been reduced to \$2.05 for Iron and \$2.15 for Steel Nails in small lots by nearly all the jobbers. This action meets with considerable disapprobation on the part of some of the leading houses, because it is the result of undue rivalry between local factions. Manufacturers continue to quote Iron Nails at \$1.95 @ \$2 and Steel Nails at \$2.05 @ \$2.10, Chicago delivery, but so far as known their price is uniformly \$1.85 at mill, the difference in price at point of delivery being an advantage gained in freight rates. Trade in small quantities is a little heavier than a week ago, while it has fallen off slightly in carloads. Stocks in the hands of jobbers are in fairly good shape. Mills in this vicinity report that they have all the orders booked that they can deliver in the next 30 days, and make no sales at figures less than those named.

American Pig Iron.—A quiet market, steady prices and regular demand ruled during the past week. Sales agents show great confidence in the situation, and buyers therefore are a little more active in closing options obtained several weeks ago. The demand is fairly good for lots ranging from 100 to 500 tons, and on choice brands sales have been made at carload prices. There appears to be more disposition to buy Charcoal Irons in large lots than any of the other grades. Foundrymen are taking their Iron largely in carloads, for which they pay full market prices. A number of large buyers who have been holding off for the past 30 days closed contracts last week upon the belief that current prices are the bottom figures that will be touched in the next three months. All standard brands of Charcoal Iron are well under contract, which makes the carload price \$19.50 @ \$20, four months, a regular figure for the majority of buyers. Coke Irons continue in steady demand at \$19 @ \$19.50. In this grade of Iron fewer large lots were sold during the week, but more shipments made of carloads. Ohio Blackband Irons have been advanced on the lower grades about 25¢ per ton on prices named about the first of last month. Dealers claim that there are no Irons of this class that can be bought much under \$19, while the best brands are held at \$20.50. Cheap grades of Ohio Softeners have been in very good request to supplement brands of Southern Iron that cannot now be obtained at a satisfactory price. On Southern No. 1 Foundry we quote \$17.50; No. 2, \$16.50 @ \$17, and No. 3, \$15.75, cash. At these figures sales of small lots have been made, but the price does not meet the views of Southern furnacemen, who claim that they get better figures elsewhere. It is also

Old Rails—Continue to be the strongest article on the whole list of Iron products. It is almost impossible to buy Rails in any quantity at the present time, as holders have an idea that they will advance to figures considerably above the present high range. We hear of several lots having been bought during the past week at \$21.50. Mills have advanced their quotation to \$21.50 @ \$22. Chicago delivery, but sellers are exceptional at this price. All those who have Rails are asking \$25, and from past experience it is probable that they will not sell at any price

Coal and Coke—Are still as active commodities as they have been heretofore in winter. The footings of this summer's

FOLLOWS:			
Charcoal Foundry.			
Hanging Rock, No. 1.....	\$19.00 @	\$21.00	
Hanging Rock, No. 2.....	18.00 @	20.00	
Southern No. 1.....	17.50 @	18.50	
Southern No. 2.....	16.50 @	17.50	
Coal and Coke Foundry.			
Ohio Soft Stonelocal, No. 1.....	17.00 @	17.50	
Ohio Soft Stonelocal, No. 2.....	15.50 @	16.50	
Southern Coke, No. 1.....	16.50 @	17.50	
Southern Coke, No. 2.....	16.00 @	16.50	
Southern Coke, No. 3.....	15.00 @	15.50	
Ohio Coke, No. 1.....	16.00 @	16.50	
Ohio Coke, No. 2.....	15.00 @	15.50	
No. 1.....	18.00 @	19.00	
Ohio and West Pennsylvania Coke, No. 2.....	17.00 @	18.00	
Forge.			
Strong Neutral Coke.....	14.00 @	15.00	
Mottled.....	18.00 @	19.50	
Southern Coke, Cold Short.....	13.50 @	14.00	

Charcoal Foundry.		
Hanging Rock, No. 1.....	18.50	@ \$23.00
Hanging Rock, No. 2.....	17.50	@ 21.00
Southern, No. 1.....	16.50	@ 18.50
Southern, No. 2.....	16.50	@ 18.50
Southern Mill.....	13.50	@ 17.00
Coke.		
Hanging Rock, No. 1.....	17.00	@ 18.00
Hanging Rock, No. 2.....	16.00	@ 17.00
Ohio Softeners, No. 1.....	18.00	@ 20.50
Ohio Softeners, No. 2.....	17.50	@ 19.50
Hanging Rock Softeners, No. 1.....	16.50	@ 17.50
Hanging Rock Softeners, No. 2.....	15.50	@ 16.50
Southern, No. 1.....	15.50	@ 17.50
Southern, No. 2.....	15.00	@ 15.50
Southern No. 1 Forge.....	13.50	@ 14.50
Southern No. 2 Forge.....	13.50	@ 14.00
Wheel Irons.		
Hanging Rock, Cold Blast.....	24.00	@ 35.00
Hanging Rock, Warm Blast.....	19.00	@ 30.00

The Southern Exposition opened at Louisville, Ky., on the 28th ult. The day was a general holiday in the city, and large crowds swarmed out to the grounds. The first day in the exhibition was further advanced than is usual, although a number of the finest displays are yet to be set up. The opening of the Exposition marks the beginning of a busy and prosperous season for Louisville, and a pleasant and instructive time for visitors, who are crowding the hotels.

Trade Report.

General Hardware.

The first week of the month has given an increasing trade, and the market is characterized by a fair—not heavy, but steady—demand. There is little evidence of a speculative movement, and purchases are in nearly all cases limited to the immediate wants of the trade. Orders from wholesale houses, especially in the West, indicate that stocks are light and in some cases broken, and retailers also are not carrying more goods than they require. Prices show but little variation, being generally decidedly firm, exceptional lines for special reasons being irregular, and in a few cases lower. Merchants are much more frequently called upon to mark goods up than down. Collections are easier than they have been, but are still rather slow. The outlook is on the whole satisfactory, and a good business is anticipated.

NAILS.

The New York market has been dull during the last week, with a feeling of weakness prevailing. The demand is light, buyers holding off awaiting developments. We quote nominally \$2 for Iron Nails in carload lots, from which concessions are obtainable. We discuss the situation editorially.

A meeting of the Eastern manufacturers is to be held to-morrow.

BARB WIRE.

The withdrawal of one of the manufacturers from the Eastern association and the competition of Western works have led to a drop in the New York market, carload lots of Four Point Galvanized Barb Wire being obtainable at 3.90 cents to 4 cents. Some of the Eastern manufacturers are doing a heavier business now than they have ever done thus far at any season of the year, and the decline seems to have brought out buyers generally.

MISCELLANEOUS PRICES.

The agreement among the manufacturers of Casters is reported to be working satisfactorily, and the goods are held firmly at the new prices. The market is the more regular at these figures, inasmuch as not many of the large trade were permitted to place orders previous to the advance, thus relieving quotations from the demoralization that manufacturers often promote by the readiness with which they allow jobbers to load them up with heavy orders at the time of an advance.

The arrangement between the manufacturers of Augers and Bits is generally reported to be working satisfactorily. The manufacturers are said to be adhering closely to prices, and a disposition is manifested to make an advance, if feasible, at an early date. The advance, if made, would be a slight one, and it is not clear whether or not it will be thought best to make it.

The Tack market continues in about the same condition as regards quotations that it has been in for some time, the prices being described by the manufacturers as unremunerative, and recognized by the trade as low. There are, however, reports that some of the large houses, anticipating that these extreme prices will not continue indefinitely, are placing liberal orders for the goods. While there is little or no speculative activity, Tacks are generally regarded as safe purchases.

The following are the prices of the Horse-shoe brand of Carpet tacks, which have just been put on the market by the Walkley Hardware Company, Plantville, Conn.:

Horseshoe Brand, Uniform Weights, Blued 10¢
Horseshoe Brand, Uniform Weights, Tinned 14¢
Horseshoe Brand, Double Uniform Weights, Blued 20¢
Horseshoe Brand, Double Uniform Weights, Tinned 24¢

These goods are put up in uniform 2-ounce and double uniform 4-ounce weights, in neat boxes with attractive labels. We are advised that for the short time that they have been on the market they have been very favorably received by the trade, some large orders being placed for them from leading houses.

Prices of Brass Butts are held with fair firmness at recent figures. The manufacturers of Cast Iron Butts adhere closely to quotations, and the market is firm, although prices are sometimes shaded by houses holding stocks purchased at lower figures.

There is nothing new in Screws, prices remaining substantially as they have been, with perhaps a slight tendency toward small concessions.

Tackle Blocks are badly demoralized, and still lower prices are made. There appears to be a somewhat reckless competition among the makers, unless, indeed, the object be to form in the near future a combination which will secure satisfactory prices. Of this, however, there are no definite indications.

Machine Bolts and Bolt Ends are, without any concerted action of the manufacturers, slightly higher, and quotations should be advanced. The necessity for revising the list is referred to, as there is an inequality in the prices on the present list between the large and small sizes, which is taken advantage of by close buyers.

The Lock market is not as firm as the manufacturers would desire, and concessions beyond those that have recently been made are reported, so that to close buyers quotations are a shade lower. Padlocks remain without material modification, prices being low and much below the nominal printed prices.

The recent entrance into the market of new manufacturers of Wire Nails, with those already in the field, helps, from the increased production, to continue the irregularity to which we have before referred. The market is unsettled, and slight additional concessions are made where necessary. A large amount of goods is sold, and the Standard Penny Nails are being turned out in larger quantities, in response to what seems to be a gradually increasing demand.

There is no material change in the prices of Nuts and Washers, slight variations being made from time to time, as the circumstances of the case and the character of the order may call for.

The prices of Copper Rivets and Burrs and other Copper and Brass goods are stronger than they have been, while there is as yet no change in prices that calls for mention. The mills are reported to be very busy, especially on orders for Sheet goods.

The competition between the Chicago jobbers is at present at least as active as usual, and as a result, from some places in the vicinity of that city and not out of reach of St. Louis, we hear of exceptionally low prices being made.

There is no change in the quotations for Cartridges, and prices are as a rule firmly maintained by the contract houses and jobbers. Instances are, however, more or less frequent in which, in a covert way, concessions are given which are not permitted to appear in the invoice. There is, however, not as much of this cutting going on as was anticipated when the present arrangement was made.

The prices of Brass Cocks are maintained with regularity, and there are no intimations that the goods can be obtained from the manufacturers at irregular prices.

The Ireland Mfg. Company, Cincinnati, Ohio, for whom W. H. Jacobus & Co., 90 Chambers street, New York, are agents, withdraw previous quotations on the Morris and Triumph Sash Locks, and announce the following revised price list, which is subject to a discount of 50 and 10 per cent., 60 days, thus making, it will be observed, a material reduction in prices:

The Morris Sash Lock.		
No.	Description	Per doz.
00.	Iron, Plain Japanned	\$1.06
01.	Iron, Plain Japanned	1.18
1.	Iron, Plain Japanned, Brass Tip	1.62½
2.	Iron, Plain Japanned, Nickel Plated	2.06
3.	Plain Polished Bronze	2.25
4.	Plain Polished Bronze, Nickel-plated	2.75
04½.	Iron, Tucker Bronze, small size	1.57½
4½.	Iron, Tucker Bronze	1.97½
5.	Ornamental Iron, Tucker Bronze, Real Bronze Drop and Tip	2.30
6.	Ornamental Real Bronze	7.50
7.	Extra Heavy, Plain Polished Bronze, with Burglar-proof Plate	15.00
8.	Same as No. 7, Nickel-plated	18.75
9.	Ornamental Real Bronze, Dark Inlaid	7.50
10.	Ornamental Real Bronze, Antique Finish	7.50
11.	Plain Polished, Real Bronze, Antique Finish	7.50
12.	Ornamental Real Bronze, Silver-plated	15.00
13.	Plain Polished Iron, Boston Finish	8.50
14.	Extra Heavy, Ornamental Real Bronze, with Burglar-proof Plate	15.00
15.	Same as No. 14, Dark Inlaid	15.00
16.	Very Heavy Plain Polished Bronze for Extra Heavy Sash	22.50
17.	Same as No. 16, Nickel-plated	26.25
18.	Plain Polished Iron Copper Bronzed, Brass Tip	4.70
19.	Iron, Plain Lacquered	1.10

The Triumph Sash Lock.		
No.	Description	Per doz.
20.	Plain Iron, Japanned, with Iron Rivet	1.18
21.	Plain Iron, Japanned, with Brass Rivet	1.62½
22.	Plain Iron, Japan Iron, with Nickel-plated Rivet and Drop	3.06
23.	Plain Polished Bronze Metal, with Bronze Rivet and Drop	5.25
24.	Plain Polished Bronze Metal, Nickel-plated	8.75
24½.	Ornamental Iron, Tucker Bronze, Metal Rivet and Drop	1.37½
25.	Ornamental Iron, Tucker Bronze, Solid Bronze Rivet and Drop	2.30
26.	Ornamental Solid Bronze Metal, Bronze Rivet and Drop	7.50
27.	Ornamental Solid Bronze Metal, Bronze Rivet and Drop, Dark Inlaid, No. 3 Finish	7.50
28.	Plain Polished Iron, Bronze Nickel, Boston Finish	2.80
29.	Plain Iron, Lacquered, with Iron Rivet	1.12½
30.	Plain Iron, Bronze Ball Rivet, Lacquered	1.37½

The following the price list of the Empire Sash Pulleys manufactured by the Empire Portable Forge Company, Cohoes, N. Y., a description of which is given among our Hardware Novelties on page 29. The list is subject to a discount of from 55 to 60 per cent., terms 30 days, or 2 per cent. discount for cash in 10 days:

Plain Face, Underground Wheel, 2 inches, in bulk, 62 cents per dozen; in papers, 1 dozen each, 68 cents per dozen.
Plain Face, Polished Wheel, 2 inches, 50 cents per dozen; in papers, 1 dozen each, 71 cents per dozen.
Bronzed and Polished, Face and Wheel, 2 inches, in papers of 1 dozen each, 90 cents per dozen.
Nickel-plated and Polished, Face and Wheel, 3 inches, in papers of 1 dozen each, \$2.25 per dozen.

The Pulleys are packed in barrels of about 120 dozen each and delivered f.o.b. in New York City or Cohoes, N. Y., or Reading, Pa., without charge for cartage or barrels. If ordered in lots of less than one barrel an extra charge is made for packages.

The Southwark Scale Company, 51 North Second street, Philadelphia, Pa., issue a sheet containing illustrations and list prices of their line of Scales. The following are the list prices of their I X L Scales, which they have recently added to their assortment, and which are represented in their advertisement on page 43. The list as given below is subject to a discount of 50 per cent.:

I X L Counter Scales.			
Capacity.	Scop.	Scop.	Scop.
No. 51, 16 lbs.	\$12.00	\$14.00	\$16.00 each
No. 52, 8 lbs.	9.00	10.00	11.00 each
No. 53, 4 lbs.	6.00	7.00	8.00 each
No. 54, 2 lbs.	3.50	4.50	5.50 each

Double Plate Scales.			
Capacity.	Scop.	Scop.	Scop.
No. 51 A, 16 lbs.	\$14.00	\$16.00	\$18.00 each
No. 52 A, 8 lbs.	10.00	12.00	14.00 each
No. 53 A, 4 lbs.	7.00	8.00	9.00 each
No. 54 A, 2 lbs.	4.50	5.50	6.50 each

Butchers' Meat Scales.			
Capacity.	Scop.	Scop.	Scop.
No. 51 H, 16 lbs.	\$12.00	\$14.00	\$16.00 each
No. 52 H, 8 lbs.	9.00	10.00	11.00 each
No. 53 H, 4 lbs.	6.00	7.00	8.00 each

Round Porcelain Plates furnished at same list.

Brass Weights for I X L Scales.			
Capacity.	Scop.	Scop.	Scop.
8 lbs. to ½ oz.	16 lbs.	\$12.00	
4 lbs. to ¼ oz.	8 lbs.	7.00	
2 lbs. to ⅛ oz.	4 lbs.	4.50	
1 lb. to ⅛ oz.	2 lbs.	3.00	

A set of warranted Iron Weights accompany each scale.

ITEMS.

The catalogue and circulars issued by the Joseph Dixon Crucible Company, Jersey City, N. J., indicate the extensive and varied line of goods of their manufacture. It covers Pencils, Axle Grease, Stove Polish, Graphite Roof and Smoke-stack Paint, Crucibles, Graphite Cylinder and Machine Oil, &c.

Morley Bros., East Saginaw, Mich., issue a convenient pocket pamphlet giving on alternate pages a list of Lumbermen's Supplies, mentioning that they manufacture all their Lumbering Tools and Harnesses. The list given is very complete, covering Building Materials, Axes, Saws, Lumbering Tools and a variety of general supplies, together with Tools for shop, Stable Supplies, Cooking and Table Outfits, &c. The alternate pages are left blank for memoranda as to the quantity wanted, &c.

The announcement of Foundry and Machine Works for sale at Staunton, Va., will be observed among Special Notices on page 18, with particulars which will be of interest to those considering such an investment.

The Ideal Mfg. Company, New Haven, Conn., issue a circular describing the Ideal Reloading Implements, which are manufactured under J. H. Barlow's patents, giving revised list prices, together with illustrations and descriptions of the goods.

The Gong Bell Mfg. Company, East Hampton, Conn., issue two catalogues, one describing their varied line of Gong Bells, together with Hand Bells and Call Bells and some styles of Sleigh Bells. The other catalogue is devoted to Bells and Bell Toys, the latter line being intended for the Toy and Fancy Goods trade, and showing a variety of novelties.

The Eagle Machine Company, Lancaster, Ohio, issue a pamphlet describing their Eagle Enslage and Fodder Cutters, Corn Shellers, Rotary Hand Corn Planters, Horse-Powers, Jacks, Animal Pokes, &c. Of these machines cuts and descriptions are given and their special features described.

Morley Bros., East Saginaw, Mich., issue a notice that they own and control all patents upon the Railroad Stepladder, and have the exclusive right to manufacture and sell the same, and they accordingly warn persons against manufacturing or selling this article without authority from them.

The Bevin Bros. Mfg. Company, East Hampton, Conn., issue a catalogue and price list illustrating the line of Bells which they are manufacturing. Illustrations are given of the different styles, with list prices.

The East Hampton Bell Company, East Hampton, Conn., in their catalogue for the present season illustrate, with list prices, their well-known line of goods. It contains also representations of Team Bells, Shaft Chime Bells and a Dash Plume which are new this season.

The St. Louis Corrugated Roofing Co., St. Louis, Mo., issue a unique and striking calendar calling attention to their Roofing, Siding and Ceiling.

James Robertson & Co., Baltimore, Md., state that in consequence of the recent fire at their works their removal was necessitated in order to allow of the works being rebuilt, and announce that they have leased the centrally-located four-story warehouse 21 South Charles street, which they have fitted up and stocked with a complete assortment of Plumbers', Gas and Steam Fitters' Supplies and Tools.

Our readers will observe the advertisement on page 30, in which the Arc Scale Mfg. Company, Davenport, Iowa, illustrate their Arc Scales, a new line of which has recently been put on the market.

The William Rogers Mfg. Company, Hartford, Conn., for whom V. P. Humason is agent, No. 80 Chambers street, New York, issue two catalogues, one devoted to Silver Plated Hollow Ware and the other to Silver Plated Flat Ware. Both catalogues are much larger than the last issue, the Hollow Ware catalogue especially, containing, it is said, six times the line found in their previous one. Both are handsomely printed and fully illustrated, and will serve the convenience of the trade.

Announcement is made by W. K. Morrison & Co., Belfast, Me., September 1, that John G. Pendleton retires from their firm. The business will be conducted in the future, as in the past, by W. K. Morrison, under the

same firm name. It is also intimated that as Captain Pendleton has never had any interest in the business, except to add financial strength to the concern, his withdrawal in this support, which is regarded as no longer necessary, will not affect the capital invested, which is alluded to as ample for all ordinary requirements.

The trade will be interested in the illustration of the Allard Spiral Screw Driver on page 30, where the Alford & Berkele Company, the sole agents, call attention to its special features and give prices on it.

S. A. Haines & Co., 90 Chambers street, New York, have taken the agency of the Keystone Fork Works, Lawson & Brenizer, Philadelphia, on which they are prepared to name the lowest prices for both home and export trade. They have also been appointed sole agents for the sale of a new line of Picks, Mattocks, Grub Hoes, &c., which are made by the Jefford's Axe Company. The quality of the goods and the prices at which they are offered are alluded to, and it is intimated that it is proposed to make the genuine Washoe goods as they were originally made.

WHAT THE TRADE SAY.

The following extract from a letter of one of our subscribers, while not referring exclusively to Hardware topics, will be of interest as expressing what, we fear, has frequently been the experience of many of our readers:

Trade is looking up somewhat, and cooler days and nights cause people to inquire about Heating Stoves. Dealers are getting their Stoves on their floors. I have been struck with the general lack of good common sense, and judgment among mechanics in doing work outside of their every-day routine. I had a brick mason building the well and cold-air chute for a portable Furnace. The man has been working at his trade 30 years or more. Even after having given him directions as to how each part should be constructed, I had to overlook the laying of each brick, and some work had to be taken down and done over. He seemed to have objections to build to the measurements I gave, and was continually suggesting some other way of doing the work. This might have been excusable had he been accustomed to that kind of work, but this was his first job. The remark is quite commonly made by people having work done: "I have got to stand right over this man to have it done as I want it." There is hardly a mechanic but will slight a job when he has a chance. There must be a reason for this—i. e., lack of education in learning the trade, and lack of general knowledge outside his trade. Very few men but will guess at the length of something and then spend twice the time patching the error caused by the carelessness than if it had been done right in the first place. I saw yesterday a pipe-fitter waste enough time in cutting the threads on a pipe, because of a defective pipe-holder, to do three times the work. A job of spouting caught my eye where they had run a straight piece of pipe from the outlet to the down spout instead of making an offset with an elbow. A porch built to a new house conducts the water back to the building instead of having the pitch the right way, and so I might go on enumerating instances of this kind almost without number where ignorance or carelessness leave eyesores for years.

The Rector & Wilhelm Company, Omaha, Neb., issue a fall circular of seasonable goods, of which a varied line is exhibited. Illustrations, descriptions and list prices are given, with discounts. Concerning the market they say:

Since our last issue there have been but few changes of importance to note. Carriage Bolts have advanced 20 per cent., and manufacturers are contemplating a further advance in the near future. Rope has advanced 1½ cents per pound, owing to the scarcity of Sial hemp. Shot has advanced 25 cents per sack, the result of a meeting of the manufacturers and an advance in Lead Powder.—The manufacturers have held a meeting, resulting in an agreement to advance the price \$1.50 per keg. The general market is decidedly firm, and many lines have a strong upward tendency. The indications are that prices have reached bottom, and dealers will consult their own interests by carrying full stock.

In connection with a discussion which is being carried on in the columns of the London Ironmonger in regard to "the management of shops and stock," and in view of the indications that are often observed of a lack of proper care and attention to this matter, one of the correspondents refers as follows to the spirit with which employees should perform their duties, with a view both to their own and their employers' interests:

The pivot upon which the whole question turns is "duty," and the fault is not one of ignorance, but of gross neglect, on the part of the assistants, both in the welfare of their masters and their own. Let us each imagine what would be his feelings if, in the position of master, his assistants deliberately refused to study his interests and left his stock to ruin and trade to decline. And then how many are there that recognize that in studying their master, doing their best, taking advantage of every minute as it flies, and trying how much, instead of how little, work can be got into the time, they are working out their own chance of success in life! It is said that love is the best incentive to labor, but the sense of duty and one's own interest come in a very good second. Is it feasible that a man can waste half his time, shrink his work, hate the sound of a 7 a. m., and long all day for closing time during his assistantship, and then on becoming a master blossom suddenly into a business man, likely to succeed in life! And yet these are the lines upon which the majority of our young men are running. The best preparation for a successful mas-

ter's life is a faithful service, and he who during that time does his duty, acts in every way as if the affairs were his own, and not his master's, and takes a pride in the appearance of the premises, can be certain of being able to fill whatever higher post may fall to his lot competently and well.

Parkhurst & Wilkinson, Chicago, Ill., under date August 26, refer as follows to the condition of the market:

The advance in many lines in our stock compels us to withdraw our quotations. The advance in Iron and Steel comes mainly from the active and large demands from railroads. The scarcity of Wagon Stock, especially Hickory Axles, Ash Tongues, Sawed Felloes, Bolsters and Reaches has caused a sharp advance in prices.

TRAVELING SAMPLE CARS.

The London Ironmonger in a recent issue, alluding to a letter of their Canadian correspondent, in which he referred to the Canadian Pacific Railway Company as purposing to run special trains for commercial travelers across the continent, with sample-room cars for the display of merchandise, remarks editorially:

The sample cars for travelers mentioned in our last issue as being likely to be adopted on the Canadian Pacific Railway ought to be very useful in many other parts of the world. As a matter of fact there is no reason why they should not be in universal use wherever railways exist. Commercial travelers who carry bulky lots of samples are only too well aware of the trouble and cost involved in taking their boxes about the country, packing and unpacking, and the frequent difficulty of securing good stockrooms at hotels or inns. By the general use of properly-fitted sample cars all that trouble and some of the cost might be avoided, while the samples themselves could in many instances be better and more effectively displayed. Heavier samples could also be thus shown to possible buyers. It would simply mean asking customers to step down to the railway station instead of to the hotel, and under some circumstances there would be a distinct gain in resorting to the former instead of the latter. In a country like Spain such traveling sample-rooms would be of the highest value, seeing that the goods could be taken about in the best possible condition, and would be free from many of the risks which might be incurred otherwise. If some enterprising railway-wagon builder would turn out a car specially adapted for this purpose he would in all probability secure a reward quite adequate to the outlay and trouble involved.

The following are the remarks of their correspondent, referred to above:

The Canada Pacific Railway Company are infusing much business energy into this country by their schemes and propositions. They now propose to run special trains for commercial travelers across the continent. Part of this train is to consist of sample-room cars for the display of merchandise. Two days are to be allowed at Winnipeg, and at Port Moody five or six days are to be allowed to visit Victoria and Westminster, British Columbia, the return trip occupying one month. With these and other advantages it will be seen that traffic will be made for the road, and that the business community will find that they have wise friends in the Canadian Pacific Railway. The commercial traveler will henceforward do much of his business in his car, and the wire at his elbow will probably conclude many a stroke of business, as he can reach his principals at almost any moment with offers. As the Germans are adopting steamers for floating sample-rooms, the Canada Pacific Railroad determined to follow the plan on the rail. English houses should follow this up. The cable to headquarters should even supersede the trade from this side if necessary.

ARRANGEMENT OF HARDWARE STORES.

In the descriptions which have been given of the different departments of Hardware stores, Nail Counters have received the largest share of attention, and many methods of arranging them have been described, each having its advantages and advocates, and doubtless serving a good purpose. Our readers have expressed surprise at the variety of Nail Counters thus exhibited, and many of them have found suggestions of value. But the variety is not yet exhausted, and we describe below still another, with decidedly novel features.

Walker & Thayer, Portland, Ore. give us the following description of the Nail

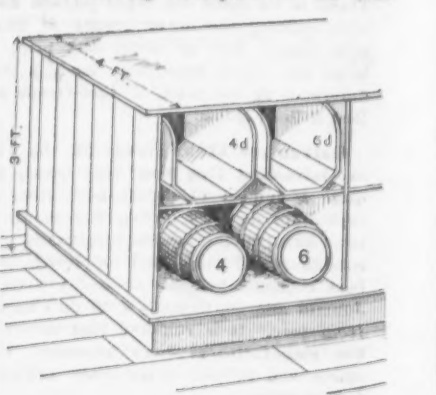


Fig. 137.—Nail Counter.

Counter which is illustrated in the accompanying cuts, Figs. 137 and 138:

The dimensions of the Nail Counter are as follows: 3 feet high, 3 feet 9½ inches wide, length 9 feet 8 inches, the top, which is of ash, projecting so as to make the counter top 4 feet wide and 10 feet 2 inches long. Nail boxes as represented in Fig. 138, slide in from each side, back to a partition on the shelf, 18½ inches from the floor, 6 inches of this height being the platform base of Counter. The size of the Nail boxes are as follows: Depth, 21½ inches.

width, 12 1/4 inches; height, 12 1/4 inches. The boxes are open on the top and on the front end, and have rollers near the middle of the back end, making it very easy to fill the box on the floor. Then, lifting it so that the back end rests on the shelf, it is easily pushed into place. We have used this Counter for Nails for the past three years, the previous use in the store of our predecessor, A. Goodnough, being nearly four years. The case was built and planned by Mr. Goodnough six or seven years ago, and

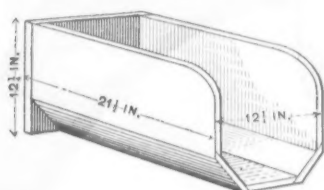


Fig. 138.—Nail Box.

has always been considered a model Nail Counter, as numerous measurements and drafts of it will testify.

Our readers will follow with interest the description given below of the Hardware and Iron store of W. H. Miller, Bay City, Mich., which is illustrated in the accompanying cuts, Figs. 139, 140, 141, 142 and 143. As comparatively little has been said in this discussion in regard to the arrangement of Iron rooms, a description of Mr. Miller's method of storing Iron and Steel will be of special interest:

My Iron room, Fig. 140, is 100 feet in length and 25 feet wide. You will notice that I send you a sectional view of my Iron pit, Fig. 141. This pit is 4 feet deep, 9 feet

three floors is used for storing Hardware, Paints, Oils, Glass, Nails, Stoves and other goods making up my stock. Therefore my remarks will be narrowed down to a description of my first floor. You will notice I have two entrances from

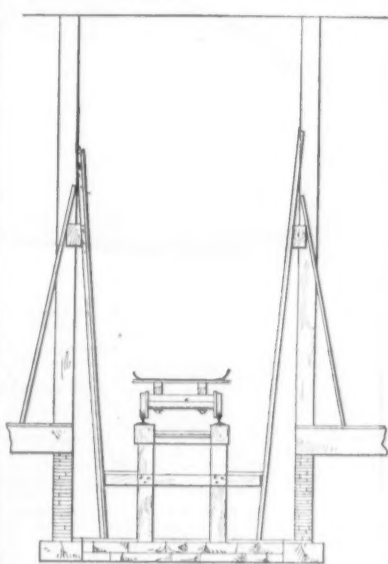


Fig. 141.—Section of Iron Pit.—Scale, 4 Feet to Inch.

the front to this floor—one to the office and the other to the store. This room is a large, well-lighted room, 50 x 100 feet, and 16 feet in the clear. The entire south side

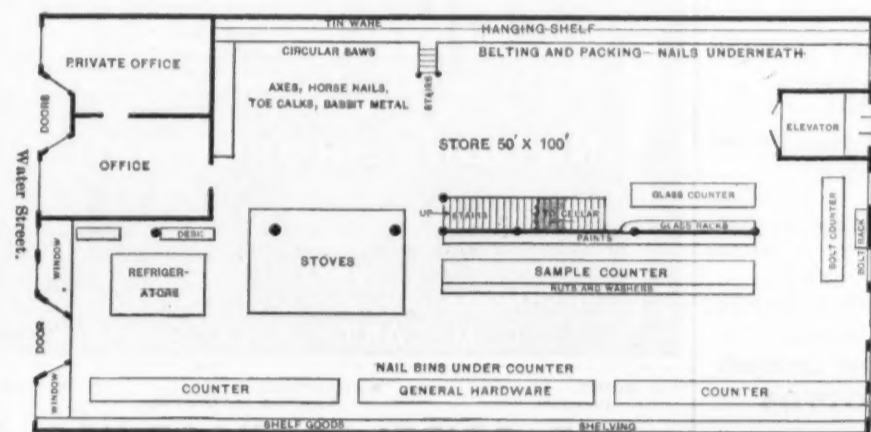


Fig. 139.—Diagram of W. H. Miller's Store.

wide and nearly the length of my Iron room. On each side of this pit and extending its entire length a wooden frame is built from the floor to the ceiling, of proper size timbers, against which the upper ends of the bars rest. Iron pins about 18 inches long are driven in this wooden frame, so as to keep each size separate. You will notice on my plan and end view of Iron pit that an Iron T-rail track runs from my Saginaw street front through the entire length of my Iron room, passing between the rows of Iron that stand in the pit. This track is about 30 inches wide, and it crosses the alley to my power elevator in the rear of my Hardware store. A car made of iron runs on this track, and passes, as you will notice, over a dormant platform scale, made expressly for this purpose by Fairbanks & Co.

The Iron is received either at the Saginaw street front or in the alley, taken from the dray, and placed on the car, and after being weighed each size is put in its proper place. I can easily carry in stock at least 400 tons of Bar Iron; and as the bottom of the Iron pit is solid stonework covered with oak plank, the weight of the Iron has no effect on my building. I do not carry my Steel stock in this pit; the Bars being shorter. I stand the Steel on the outside of the pit and back of the Bar Iron, a place being made for each size by driving iron pins in the wooden frame. In this Iron room I carry my stock of Heavy Hardware, such as Horse Shoes, Wrought Nails, and Railroad Spikes, Coils Wire, Sash Weights, Building Paper, Coil Chain, Anvils, Vises and Wagon-Makers' Hardware.

My Agricultural department adjoins my Iron room and is the same size. In this room I have a hanging platform extending nearly the entire length of the north side wall, on which I carry a stock of light Agricultural Tools. On the opposite side I have about a dozen bins that are used for different size Wagon Wheels, about three sets in each bin. The floor space of this room is used for Carriages, Wagons and Machinery pertaining to this business. A hand elevator in this room connects it with the second floor. On the second floor I carry my stock of Wagon-Makers' Woodwork and other light articles in the agricultural line. I have my tinshop on this floor, where I manufacture every thing in the line of Tin, Copper and Plain and Galvanized Sheet Iron, besides Gas and Steam Fitting.

In regard to the arrangement of his store, the first floor plan of which is given in Fig. 139, Mr. Miller writes:

Before going into details I will say that my business is principally Heavy Hardware, such as is used by lumber mills and lumbering. I carry besides a full stock of Builders' House Furnishing and Carriage makers' Hardware, Stoves, Paints, Oils, Painters' Supplies and Agricultural Implements. The building I occupy was built expressly for this business about 15 years ago, and is on Water street, running back 100 feet to an alley, as you will see by the drawings, Figs. 139 and 140. It has a frontage of 50 feet, and is three stories, with a basement. This gives me 20,000 square feet of floorroom for these departments of my business. I do not claim any new features in the arrangement of my stock in cellar or the two upper floors, as the entire space on these

wall of this room is shelved from the floor to the ceiling. The shelves are 18 inches deep, except for a space of 3 feet from the floor up; here they are 3 feet deep, which gives me a shelf counter 18 inches wide and extending the length of the room, Fig. 142. In order to reach the top shelves I have

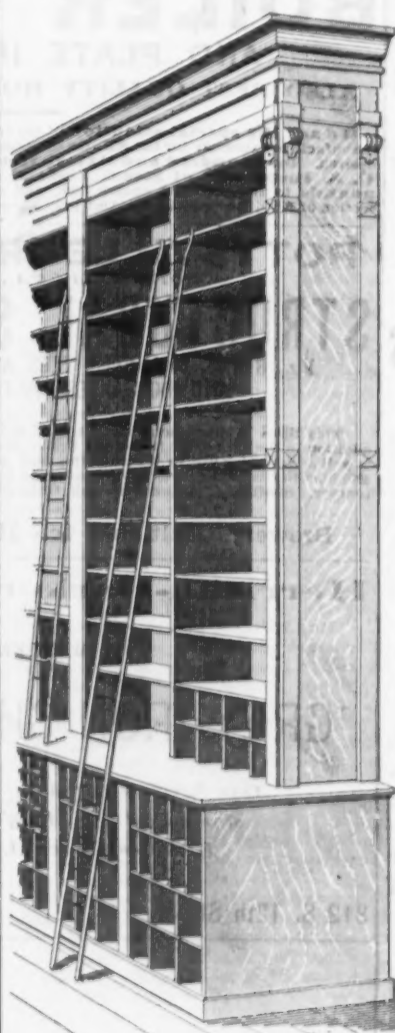


Fig. 142.—Arrangement of Shelving and Ladders.

stationary ornamental iron ladders running from this shelf counter to the top shelf, one end being bolted to the center and upper end fastened to the shelf. These ladders are about 8 inches wide, the sides being made of 1 1/4 x 1/4 flat iron, and the rings 1/2-inch round iron. They do not interfere with the stock on the shelves, as the shelves are built in sections of about 10 feet in each section, and these ladders are placed at each section, or about 10 feet apart.

On these south side shelves I carry my retail stock of Hardware in original packages.

I do not carry my stock in painted wooden boxes, but place the original package of Hardware on my shelves for retail, as my experience teaches me this is decidedly the most convenient and best way of getting at the stock quick. One distinctive feature I have adopted in the arrangement of my stock is that for many articles—such as Mill Files, Copper Rivets and Burrs, Clout and Finishing Nails, Tacks, Screws and other goods, as shown in Fig. 142—I have partitioned off some of the shelves in bins of sufficient size to carry a stock of all such articles in separate bins. For instance, I carry in stock Mill Files from 6 to 14 inches inclusive (eight sizes of Mill Files), of two or three different makes, in all about 20 bins for Mill Files, A, Fig. 142. Each bin will hold from 25 to 50 dozen Files. For Copper Rivets and Burrs the bins will hold about 50 pounds of each size, and, as I carry in stock all sizes from 3/4 to 1 inch inclusive, and from No. 7 to No. 12 inclusive, it takes about 30 bins for Rivets and Burrs. Bins for Clout and Finishing Nails from 1/4 to 2 inch inclusive, C, Fig. 142, are made to hold 100 pounds of each size. For Screws they are made to hold from 10 to 20 gross of each size from 3/4 to 1 inch inclusive. Strap and T Hinges are arranged in the same way, a bin for each size, and many other articles are handled in the same manner. I consider this a very convenient way to handle many articles in the Hardware line.

I have no new feature for sampling Stoves.

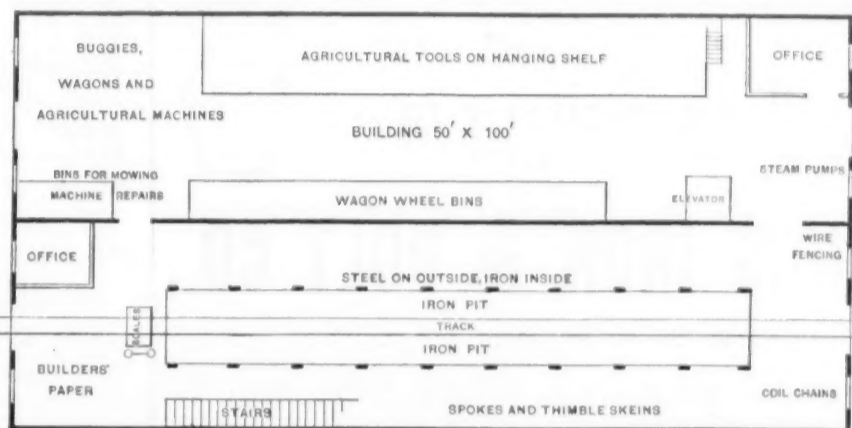


Fig. 140.—Iron Room and Warehouse.

for business, very seldom getting out of order. This engine also runs a machine for cutting Shingle Bands. The machine is on the second floor, and connected with the engine in the cellar, with a 3-inch belt passing through first and second floors. As it is necessary to keep the engine in motion nearly all the time in order to work the elevator, the expense for operating the Shingle Band machine is trifling.

If any of your large army of readers wish any further information with regard to the arrangement of any part of my Iron room or main store, by writing to me they will be cheerfully furnished any desired information.

Locomotive Fuel Records.

Mr. Granville Carlyle Cunningham, who until recently occupied the position of acting-chief engineer of the Canada Southern Railway, has prepared an interesting table giving the consumption of fuel on locomotives on a number of different railroads. This he has embodied in a paper presented to the British Institution of Civil Engineers a short time ago, with the object of showing not only the amount of coal consumed per unit of work done, but also the variation in consumption on different roads, and the proportion of energy of the fuel utilized to the full energy. Unfortunately Mr. Cunningham has followed one of the old—and, we regret to say, customary—practices of adopting for the unit of work the ton weight moved 1 mile, and his results accordingly lack that significance which the use of a more satisfactory

details, and therefore extract from it only the figures which have a more direct bearing on the main subject.

It will be noticed that on the Canada Southern road the consumption of fuel is lower than on any of the other lines, favoring the assumption that the gradients and curves are very light. In this we are supported by Mr. Cunningham, according to whom there is almost throughout no grade steeper than 15 feet to the mile, and the alignment is remarkably free from curves. The grades on the Michigan Central Railroad are considerably steeper than those on the Canada Southern, and in places reach 52 feet to the mile. On the Hannibal and St. Joseph the grades are apparently yet steeper, since, though no definite reference is made to this point, the trains hauled, according to the figures in the original table, are much shorter than on the other three roads. On the Lake Shore and Michigan Southern the grades again are easier and nearly as good as those on the Canada Southern. These facts are reflected in the figures which we give, and should be borne in mind in making comparisons. As regards the proportion of fuel energy wasted in locomotives, Mr. Cunningham takes the case of the Canada Southern Railway alone, as only for this line the necessary information concerning gradients was available. Adopting D. K. Clark's figure of 14,133 heat-units for the heat of combustion of 1 pound of coal, or an equivalent of 5455.3 foot-

tons, he calculates that with an average grade of 5 feet to the mile, making the resistance to haulage 11 pounds per ton, the full energy of the coal is to the work effected as 100 is to 3.5, representing a loss of 96.5 per cent. It is to be regretted that this investigation could not be extended to the other lines, but, even limited though it has been to one case, the result indicates clearly the field for improvement which is yet open to the engineer.

The foundations of the United States Army building, on the site of the old Produce Exchange, are being laid on heavy piles. The ground measurements are about 104 x 92 feet, the height eight stories. Up to the second-story cornice the walls will be of rock-faced red American granite blocks, and above of pressed brick with belt courses. All the interior columns are to be of cast iron, the beams and girders of rolled steel, the floors of fire-clay blocks, covered with yellow pine, rendering the building nearly, if not quite, fire-proof, the only combustible parts of it being the floors and doors.

The total shipments of coke from the Connellsville region last month were 25,465 cars, against 25,400 cars for August. For the 25 working days, one day having been lost by reason of the Knights of Labor picnic at Scottdale, the daily average was 1021 cars. Of this output the syndicate shipped 17,690 cars, and the outside producers 7875. Of the 10,930 ovens reported

	Canada Southern.	Michigan Central.	Hannibal and St. Joseph.	Lake Shore and Michigan Central.		
	1881.	1879.	1880.	1879.	1880.	1881.
Total engine mileage (including shunting).....	3,749,701	7,097,051	7,090,051	1,995,739	13,586,307
Passenger train mileage.....	987,337	1,608,008	1,865,228	414,118	410,398	2,549,081
Number of passengers moved 1 mile.....	40,917,987	93,222,490	115,323,789	21,545,368	19,927,041	176,148,767
Freight train mileage.....	1,775,367	3,087,306	3,066,605	989,005	975,933	7,491,089
Number of tons of freight moved 1 mile.....	487,065,507	721,019,413	735,611,905	111,987,174	130,605,740	1,851,169,018
Total amount of coal con- sumed..... tons	127,270.5	280,169	308,971	69,950	76,998	502,330
Tons of coal apportioned to passenger service.....	88,072	75,250	84,078	15,100	17,491	102,837
Pounds of coal consumed per passenger train mile.....	77.12	88.98	90.15	73.11	85.24	80.68
Pounds of coal consumed per ton moved 1 mile.....	1.13	1.10	1.01	0.86	0.98	0.80
Pounds of coal consumed per freight train mile.....	1.86	1.61	1.45	1.31	1.75	1.16
Tons of coal apportioned to freight service.....	89,198	204,910	219,893	54,800	59,497	399,493
Pounds of coal consumed per freight train mile.....	100.49	111.17	120.20	119.83	121.77	109.78
Pounds of coal consumed per ton of freight moved 1 mile.....	0.967	0.57	0.60	0.98	0.99	0.43
Pounds of coal consumed per ton of gross weight*.....	0.108	0.25	0.27	0.40	0.41	0.17
Average miles run by engines per ton of coal.....	29.46	27.47	27.47	25.95	27.04

* Weight of the cars is assumed at 10 tons each.

basis of calculation would have given them. Notwithstanding this drawback, however, they are of general interest and deserve attention.

In preparing the table, which embraces figures for the Canada Southern, the Michigan Central, the Hannibal and St. Joseph and the Lake Shore and Michigan Central railways, considerable difficulty was naturally experienced in obtaining the requisite data, since the published annual reports seldom give the information in the direct manner in which it is required. Mr. Cunningham is therefore entitled to credit for having arranged it in a compact and readily accessible form. All the figures have been drawn either from the published reports or from information obtained directly from the railroad officials. We have not space for the table complete, as it embraces a mass of

available in the region there were but 443 idle last week, classified as follows: Fuel ovens, 216; furnace ovens, 100; old Mt. Braddock Works, idle for several years, 127.

A syndicate represented by E. R. Chapman, of New York, have purchased a controlling interest in the Cumberland Mountain coal fields, lying in East Tennessee, between the Knoxville and Ohio and Cincinnati Southern railroads.

The entire plant of the Melrose Sewing Machine Company, at Chillicothe, Ohio, including the buildings, are offered for sale by Mr. Nelson Furdum, receiver. An inventory of the property of the corporation, including a list of the machine tools, is given in another column of this issue.

MECHANICAL.

New Hydraulic Presses.

The Illinois Iron and Bolt Company, of Carpentersville, Ill., have just put on the market two hydraulic presses of which we annex engravings.

Fig. 1 shows a press of 50 tons pressure capacity, intended for pressing boxes into hubs, and for pressing on hub bands for farm and freight wagons and other purposes where great pressure is required. The pump is made of brass, the balance of cast and wrought iron. The diameter of the ram plunger is 8 inches, and the diameter of the pump plunger from 1 to 1 1/4 inches. It will raise 6 inches. Its weight is 490 pounds, and it can be operated by hand or power.

Fig. 2 shows a press having a capacity of 12 tons pressure. The pump here also is made of brass, while the other parts are of cast and wrought iron. The diameter of the ram plunger in this case is 4 inches,

Where several boilers are set together and connected by a common mud drum, and dependence is placed upon the drum and its connections for equalizing the height of the water in the several boilers, trouble is sure to arise unless the connections are very large. In such cases the connections between the boilers and the drum should not be less than 8 inches in diameter. If they are less there is danger of the water being driven partially out of any boiler which may be fired somewhat harder than the others. This is a very frequent occurrence, and overheating of tubes is the inevitable result. For the prevention of incrustation in a boiler the mud drum is wholly useless under all conditions. In all cases where a mud drum is used it should be connected and set so that access may be had to it at all times, even when the boiler is running. Such an arrangement may save much trouble. The importance of accessibility to a mud drum cannot be overestimated.

Steam domes are in the majority of cases much more useless appendages to steam

Steam drums are a nuisance, pure and simple, in ninety-nine cases in a hundred where they are used. Why steam should be generated, conducted outside of the boilers, and stored up in a drum whose only possible function is to furnish cooling surface for the condensation of the steam; passes out of the boiler, away from the influence of the furnace heat, begins to part with its heat; no matter how well the surfaces of the containing pipes or drums may be protected, there will always be some loss, which is continuous and irrevocable from the time it leaves the boiler. This radiation of heat means condensation of steam; therefore it is evident that the steam should be retained in the boiler, so far as it can be done, until it is ready to be used. Do away as far as possible with storage domes and drums, and make the body of water in the boiler the reservoir of heat. The steam supply will be much steadier and its quality will be better in this case than it will be if the conversion into steam has taken place

is also made without jointing or boring attachments, or with one and without the other, as customers may direct.

Transmission of Energy.

Discussing the question of electric-power transmission, Mr. Gisbert Kapp, the English engineer, concludes that: 1, it pays to transmit cheap water-power by wire rope if the distance is less than 1 mile, and electrically if the distance is a mile or more—this applies to all powers; 2, it pays to transmit cheap steam power if the amount of energy required at the receiving station does not exceed 10 horse-power. If the distance be less than a mile use wire-rope transmission; for distances of 1 mile and upward, up to 2 or 3 miles, use electric transmission. Beyond this limit a small local steam or gas engine is preferable. While Mr Kapp's figures may bear some modification, they are of unquestionable interest and value.

Scoring of Grindstones.

Referring to the recently oft-quoted paragraph concerning an improvement in grindstones, by which the wheel is given a reciprocating lateral motion in addition to its rotation, the *Scientific American* says:

In file-making establishments the lateral movement of the grindstone is a necessity, else the file blanks would speedily cut the stone into annular channels. In some machine shops, also, provision is made for the same movement. But if this sideways movement is absolutely reciprocal the stone will be scored as surely as though there was no movement sideways, only the scores will be curved instead of straight. For instance, suppose the shaft of the grindstone has end play enough on its journals to allow of a lateral motion of 1 inch, and a cam is fixed on the shaft with that amount of throw, a stationary guide on which the cam works to be secured to the frame. It is evident that, when the stone has made one revolution, its periphery will be, in relation to a fixed line on the frame, in exactly the same place as when it started, and in consequence if a scoring point was held against the face of the stone it would make a cut 1 inch sideways out of a direct line, but meeting to make a continuous ring, precisely as though the stone had no sideways motion.

In order to prevent this continuous and uniform action the lateral movement, in relation to the revolution of the stone, must be continually changing. For this purpose the driving belt should be on a pulley on a short counter-shaft, on which is also a gear-wheel that meshes with another on the shaft of the grindstone. This counter-shaft is to be attached by boxes to the grindstone frame. The gear on the grindstone-shaft should be wide enough on the face to allow the lateral movement of the stone without unmeshing the teeth of the gears. The cam is fixed to the grindstone-shaft, and may have its throw either as a raised strip or as a score, to be guided by a holder fixed to the frame; but if the gears have even numbers of teeth—numbers divisible by each other—the uniform scoring cannot be avoided. So, one gear should have an odd tooth—"a hunting tooth," as it is sometimes called—which will insure perpetual change. Thus, if the two gears had respectively 40 teeth and 80 teeth, there would be uniformity of throw; but with 39 teeth and 80 teeth, or with 41 teeth and 80 teeth, uniformity would be impossible. Half an inch is enough of lateral movement to the stone, and the relative sizes of gears

motives making the best use of their coal have no features about them that all engines on American railroads might not easily possess. Plenty of grate area and liberal heating surface in proportion to the cylinder capacity is the first requisite, which is supplemented by careful firing. With the high steam pressures becoming established, and the rapid flow of the gases necessary to generate steam with the rapidity it passes through the cylinders of a locomotive, doing the work of moving our heavy trains, it will never be possible to reduce the smoke-box temperature much below 600° F. That being the case, the utilizing of 60 per cent. of the fuel heat is getting close to the possible limit.

Good firing is an essential that must never be lost sight of where efforts are made to make a locomotive boiler do its work to the best advantage. When this is attended to the engine is suffering from some structural defect if the heat represented by the steam does not come close to 60 per cent. of the potential energy of the fuel. The most common mistake has been that of making the boiler too small for the cylinders, but it may occasionally be found that the boiler is large enough, yet badly proportioned in other ways. The fallacy which found numerous adherents for a time, that the tube service was of little value in steam-making, has been a costly piece of engineering heterodoxy to many railroad companies. The immense fire-boxes that came into use as a substitute for tube heating surface have not contributed to the economy of fuel in ordinary service. Where a locomotive has to work nearly at its maximum power all the time, an immense grate area common to the large fire-boxes will conduce to economy, since a moderate quantity of coal will be consumed per foot of grate; but when an engine of this kind is required to work light, the consumption of coal becomes so low for the area the fire is spread over that it is impossible to prevent waste by the cool air reducing portions of the fire-box below the igniting temperature.

With a very large grate the tendency is to supply more air than the fire requires. Every cubic foot of air supplied beyond what is necessary for chemical combination is so much superfluous gas that has to be heated and passed through the tubes. As the heat produced by a pound of coal is always the same, the temperature of the fire varies inversely with the quantity of air heated by the combustion. This being the case, it is not surprising that much disappointment has resulted from the promiscuous increase of grate area in locomotives that work light a great part of the time. The kind of coal to be used and the nature of the service the engine will be required to do ought to influence directly the proportions of grate and heating surface to cylinder capacity. When these questions receive intelligent consideration our master mechanics may safely depend on getting an economical locomotive boiler.

Cosmoline and cosmoline anti-corrosive varnish are new substances brought out in England. The cosmoline is a soft, greasy material somewhat of the character of the viscous jelly-like products of paraffine manufacture, and something like vasoline, but darker in color. Though viscous, it can be easily applied to the bright parts of machinery and metal manufactures, which it effectually protects from atmospheric influences, and prevents rusting and oxidation. It is, when desired, easily removed without

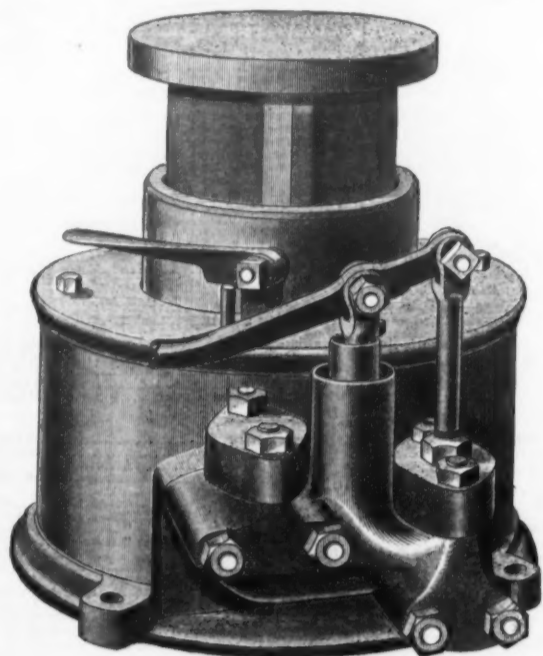


Fig. 1.—Press of 50-Ton Capacity.

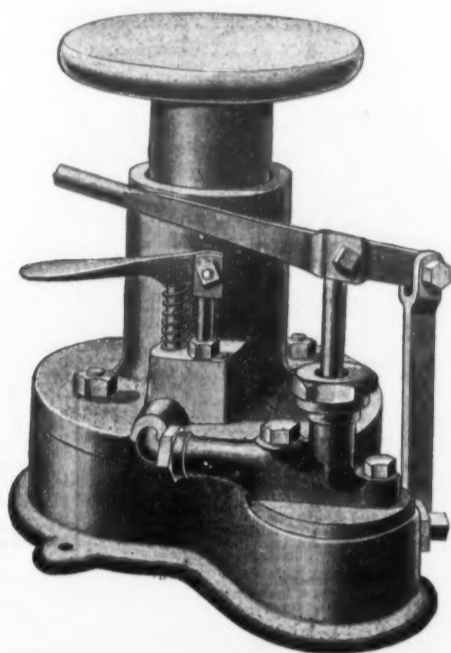


Fig. 2.—Press of 12-Ton Capacity.

NEW HYDRAULIC PRESSES, BUILT BY THE ILLINOIS BOLT AND IRON CO., CARPENTERSVILLE, ILL.

and the diameter of pump plunger 1/4 inch. It will raise 4 inches. The weight of the press is 180 pounds, and it can also be operated by hand or power. Manufacturers of light wagons and carriages will find it very convenient for pressing on skains and hub bands, and for pressing in boxes. It can also be used to advantage for other purposes where pressure is required. In both cases the engravings very clearly show the general design of the presses.

Domes and Drums.

The use of steam domes, steam drums and mud drums on all kinds of boilers, says the *Locomotive*, is the rule in some parts of this country under all conditions. Some engineers insist upon having them on boilers designed by them, and most boiler-makers would rather put them on than not. They are expensive appliances; hence there should be some good reason for their presence, else they would better be omitted. Are they in the majority of cases where they have been used worth the money paid for them? Do they exert a beneficial influence upon the working of the boilers, their durability, or upon the quality of the steam? In nine cases out of ten we believe they do not. The purpose for which mud drums are used is to form a lodging-place for sediment to deposit itself in. In most cases where it is used the feed-water is also introduced to the boiler through it. When two and frequently more boilers are set together over one grate it is common practice to connect them all together by means of a long mud drum running the entire width of the battery; very often in such cases all the boilers are supplied with water by one pipe, which delivers the water into this drum. Does this arrangement fulfill its intended purpose without other disadvantages greater than those it is intended to obviate?

As to providing a lodging place for sediment we can only say sediment should never be allowed to lodge anywhere. There is no excuse and not the slightest necessity for it. It is as easily blown out of a boiler as from a mud drum. A 2-inch blow-off pipe connected to the bottom of a boiler not over 12 inches from the back end and opened a few seconds every day at the proper time will suffice to keep a boiler entirely free from sediment. Mud drums, from their location in the cooler portion of the furnace, and more especially where the feed water is introduced through them, are exposed to a temperature which seems peculiarly apt to cause corrosion. This, taken in connection with the fact that they are usually so constructed that a proper inspection of them is difficult and often impossible, furnishes a very strong argument in favor of their abolition. A very great number of most destructive accidents have arisen from this cause alone. Where a mud drum is insisted upon, a boiler should not, under any circumstances, be fed through it. It is almost the worst place for the introduction of the feed that could be devised. The feed-water, often cold and always at a much lower temperature than the shell plates of the boiler, enters the boiler at the bottom and flows along the shell toward the front end in direct contact with the plates. The evil effects of this can hardly be overestimated. It is almost certain to fracture the shell plates in a very short time. More fractures of girth seams on boiler bottoms, with the consequent large bill for repairs, have probably arisen from this cause, in boilers fed in this manner, than from all other causes combined.

boilers, if such a thing be possible, than mud drums are. The object for which a steam dome is used is in itself a very good one, but it is rarely accomplished by using the dome. The object is, of course, to obtain dryer steam than could be had by connecting the steam-pipe directly to the boiler shell; but if a boiler is properly designed, and there is no good reason why it should not be, the steam delivered will be dryer without a dome than it will be with it. Even where a boiler is not properly constructed there is no evidence that the quality of the steam is ever improved by the addition of a dome. The object sought is dryer steam; that actually gained is the additional moisture due to the condensation within the dome, and, in the case of a large dome exposed to currents of air, this condensation will be quite a large amount unless the dome is well protected by some good non-conducting material. A dome is an expensive luxury, and, as usually constructed, very considerably weakens the boiler shell. When the opening from the boiler into the dome is the full size of the dome the shell is greatly weakened unless an elaborate system of bracing is resorted to. It is a very difficult part of the boiler to brace properly, and hence it is rarely done. When not done there is almost always leaking, and other evidences of distress are manifest around the flange at junction of dome and shell.

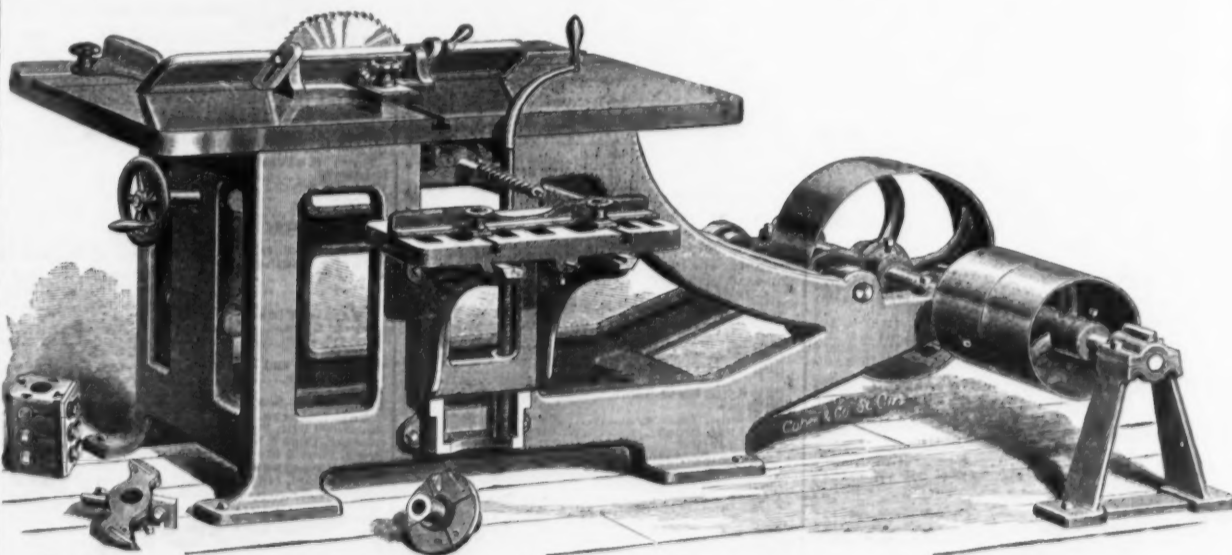
When a dome is used on a boiler the best way to make everything secure is to cut the opening through the shell out the same size and form as that made for the manhole, and rivet an exactly similar ring around the opening. This renders the interior of the dome accessible for inspection and repairs and gives it a good margin of strength. As that portion of the boiler shell inclosed within the dome is subjected to pressure on both sides, the stress on other parts of the shell, and on the shell of the dome, arising from the steam pressure, tends to flatten it, and when high pressures are used it is always well, and sometimes absolutely necessary, to so brace it as to resist this flattening tendency. This may be accomplished by tying the shell to top of dome by strong braces, or by riveting strong stiffening bars to the top of the shell inside of the dome. With large boilers and domes, the braces properly distributed and fastened form much the better arrangement, and can never be safely omitted.

The storage capacity for steam which a dome adds to a steam boiler, which is sometimes adduced as an argument in favor of their use, is insignificant, and can be obtained many times cheaper by making the boiler shell slightly larger. For example, take a 48-inch boiler with tubes 15 feet long, and provided with a dome 27 inches in diameter and 27 inches high. The dome would have a storage capacity of about 9 cubic feet, while the shell would have, with the water at its usual height, a steamroom of 52 cubic feet. 52 ÷ 9 = 5.77, and retaining the same number and arrangement of tubes we can get the extra 9 cubic feet of steamroom by simply making the boiler shell 2 inches larger in diameter. The cost of this extra 2 inches added to the shell of the boiler would be much less than that of adding a dome to the smaller boiler, while the extra surface presented to the air for the radiation of heat and consequent condensation of steam would be very much less. We will add here that either a 48 inch or 50-inch boiler is shown by experience to possess ample height of steamroom without any dome to insure the delivery of dry steam.

and an attempt has been made to bottle it up outside of the boiler.

New Variety Woodworker.

Messrs. Cordesman, Meyer & Co., of No. 170 West Second street, Cincinnati, Ohio, are directing attention to a variety woodworker, the leading features of which can be gained from the annexed engraving. The machine is of a character to be used for rip sawing, cross-cut sawing, jointing, hand planing, routing, mitering, beveling, paneling, grooving, molding, &c. The frame is massive, and the table, which is of iron, is very heavy. The counter-shaft rests on the extension of the frame, and is provided with



NEW VARIETY WOODWORKER, BUILT BY CORDESMAN, MEYER & CO., CINCINNATI.

an outside bearing in a way to insure firmness. The frame is long, making the belt from the counter-shaft to the mandrel so long as to avoid danger of the belt slipping. With reference to the advantages possessed by this machine, the makers direct attention to the fact that the different parts are not crowded together, but are so arranged as to be conveniently operated or changed, as desired, in the shortest possible time. The false table consists of two parts, and slides into the large table from opposite ends, and allows any size of head to be used. By reversing the sliding parts any size saw up to 16 inches can be used on the mandrel. The back slide can be quickly raised in height up to 1 inch above the level of the main table, for jointing, &c. The table is supplied with two fences, which can be instantly adjusted to different angles. The mandrel, which is of steel, runs in long self oiling bearings, and is raised and lowered on a swinging frame by the hand-wheel shown in the front. The swinging frame is arranged in a way to avoid jarring or vibration. The raising or lowering of the mandrel does not affect the tension of the belt. The boring attachment is shown at the side. This is raised and lowered by a screw and wrench handle. It is provided with a sliding table with an adjustable fence. Where desired an attachment for tenoning, with sliding table, is furnished with this machine. The machine

is immaterial, so long as their disproportion in number of teeth is observed.

Improving the Locomotive Boiler.

Writing under the above head the *National Car and Locomotive Builder*, in its last issue, says among other things:

We are far from wishing to depreciate efforts to reduce the quantity of coal used to generate steam in locomotive boilers, but at the same time we would like to point out that the possible saving is much more limited on well managed roads than many people believe it to be. A well-designed stationary or marine boiler with natural draft and well fired will utilize about 80 per cent. of the heat in the coal for steam-making, and about 20 per cent. will be lost by the hot gases passing through the chimney. It will never be possible to do much better than this, for the heat in the waste gases must necessarily be higher than the temperature of the boiler. These results are obtained under conditions that never can be equaled with a locomotive when a smaller boiler must be forced to evaporate a large quantity of water to the foot of heating surface. There are locomotives running on many railways, pulling heavy or fast trains, that utilize about 60 per cent. of the heat developed by the coal. Engines of this degree of efficiency are rather exceptions, as the accounting of 50 per cent. of the heat is about the ordinary average; but the loco-

solvents. The cosmoline anti-corrosive varnish is a transparent varnish used for the same purpose, but dries hard and smooth, and is preferred by many, as it thoroughly protects bright work without affecting the brightness of its appearance, while it does not rub off. It is easily applied, and for many purposes has the improving effect of a varnish.

The Rio Janeiro News calls attention to the recent action of the Government in imposing fines on foreign companies for transacting business in Brazil without formal permission. It says, by way of illustrating the workings of the system: "Some weeks ago a company, long established in Brazil, was fined \$3000 for transacting business in the Empire without official approval of statutes and permission. This company has been engaged in the manufacture of coffee machinery for many years, and though its principal factory is located abroad, it has extensive foundries and workshops in Brazil, besides three or four warehouses in different cities. In a subsequent grant of permission to transact business the Government requires the deposit of a certain sum of money in the national Treasury as a security for its obligations." An English coal-exporting company was also fined \$5000. The Rio press contends that the law was never intended to affect purely mercantile enterprise.

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25%	8.50
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15%	7.50
10%	7.00
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10 40	12.00
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WHOLESALE METAL PRICES, September 8, 1886.

METALS.

IRON.—Duty: Bars, 8-10¢ to 11-10¢ per lb.; provided that no bar iron shall pay a less rate of duty than 35¢. Sheet, 11-0¢ to 15-10¢ per lb. Band, Hoop and Rod, 1¢ to 1-10¢ per lb. Railroad Bars weighing more than 25 lb per yard, 7-10¢ of 1¢ per lb.

Standard American Pig Iron.
 Foundry No. 1 X..... 18.50
 Foundry No. 2 X..... 17.00
 Gray Forge..... 15.75 to 16.25

No. 1 Scotch Pig Iron.
 Cambro..... 18.50 to 19.00
 Coltness..... 18.50 to 19.00
 Shotts..... 18.50 to 19.00
 Glasgow..... 18.50 to 19.00
 Gartshore..... 18.50 to 19.00
 Langloan..... 18.50 to 19.00
 Summerlee..... 18.50 to 19.00
 Dalmeny..... 18.50 to 19.00
 Eglinton..... 18.50 to 19.00
 Clyde..... 18.50 to 19.00

Steel, at Eastern mills. 34.50 to 35.00
 Old Rails, Ts..... 30.00 to 31.00

Wrought, 1/2 ton, from yard. 18.25 to 18.50

Bar Iron from Store.
 Common Iron: 1/2 to 2 in. round and square..... 1.80 to 1.90
 1 to 6 in. 3/4 to 1 in..... 2.00 to 2.10

Refined Iron:
 1/2 to 2 in. round and square..... 2.20 to 2.30
 1 to 6 in. 3/4 to 1 in..... 2.30 to 2.40
 1 to 6 in. 3/4 to 1 in..... 2.30 to 2.40
 Rods—1/2 and 1-1/2 round and sq..... 2.10 to 2.20
 Bands—1 to 5-1/2 to 10-1/2..... 2.90 to 3.00
 Burden's "H. B. & S." Iron, base price..... 2.50 to 2.60
 price..... 2.50 to 2.60
 Norway Rods..... 2.50 to 2.60

Sheet Iron from Store.
 Common R. G. American. Cleaned.
 Nos. 10 to 16..... 2.00 to 2.10
 17 to 20..... 2.10 to 2.20
 21 to 24..... 2.20 to 2.30
 25 and 26..... 2.30 to 2.40
 27..... 2.40 to 2.50
 28..... 2.50 to 2.60
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MANUFACTURING.

Iron and Steel.

The United States Mitis Company are erecting small works in Jersey City in which will be placed a 1-ton open-hearth furnace and also a small crucible furnace. The intention is to make aluminium pyritic and a few castings demonstrating the capacity of the Mitis process.

P. L. Kimberly & Co., of Newcastle, Pa., have blown out their old Etna Furnace and will blow in their new furnace, which they have just erected there, in a few days.

An order was recently placed in Pittsburgh for 20,000 tons of steel rails for 1887 delivery by the Chicago, Burlington and Quincy Railroad. The order calls for special quality, and demands that 20 per cent. of charcoal iron be used.

It is stated that Jones & Laughlins, proprietors of the American Iron Works, at Pittsburgh, have determined to put an end to the difficulty between the nailers and feeders by adopting the use of self-feeding nail machines.

Henry Klein, vice-president of the Sixth District Amalgamated Association, residing in Sharon, Pa., has been tendered and accepted the position of puddle boss of the mills of Andrews Bros. & Co., at Youngstown, Ohio.

The Louisiana Wire and Iron Mfg. Company, capital stock \$25,000, have been incorporated at New Orleans, to manufacture iron, wood and tin ware, fencing, railings, &c., with Fred. A. Johnson as president; J. Henry Behan, vice-president; William F. Bunce, secretary, and David Lemley, treasurer.

The new nail factory of the Chicago Steel Company, at Hammond, Ill., is being pushed to completion. The nail factory, keg factory, office building and warehouses are up, and the nail mill is ready for the machinery now being built in the East. The factory will contain 150 machines, and have a capacity of 1500 kegs per day. The nails will be made of steel instead of iron.

Howard, Childs & Co., of Pittsburgh, dealers in manufacturers' supplies, shipped an order last week to the Columbia Gas Light and Fuel Company, of Franklin, Pa., for 5 miles of 10-inch pipe.

The wages of the 40 men employed at the Union Boiler Works of Ober & Eckert, at Reading, Pa., have been increased 10 to 15 cents a day, and they will hereafter receive \$2 for a day's wages.

The report published in the Pittsburgh papers to the effect that Isabella Furnace No. 1, at that place, had shown signs of chilling and would be blown out is without foundation. The furnace was never in better working order than at present.

The Lewis Foundry and Machine Company, Limited, of Pittsburgh, recently erected a large nail plate mill for the E. & G. Brooke Iron Company, at Birdsboro, Pa., and they have now in course of erection a very complete steel blooming mill for the Glasgow Iron Company, at Pottstown, Pa.

Forty nail machines are in operation in the new mill of the Mahoning Valley Iron Company, at Youngstown, Ohio, and it is stated that there are an abundance of feeders applying for work. The feeders have taken no further action relative to an advance in wages.

The Falcon Iron and Nail Company, at Niles, Ohio, have placed 12 automatic nail feeders in their factory.

The first steel car-wheel ever rolled was made last week at the works of Totten & Co., at Pittsburgh, machinery weighing 90 tons being used. The experiment was considered entirely successful.

The puddlers employed in the rolling mill of the Jackson & Woodin Mfg. Company, at Berwick, Pa., recently made a demand for the Philadelphia scale of wages for puddling, refusing to be governed by the rate of wages prevailing in the Harrisburg district, as heretofore. The company deeming the demand unjust, and feeling that the condition of the market did not warrant the advance, immediately shut down the puddling department of the mill for an indefinite period. The company have operated the mill without profit for the past two years, and they consider the action of the men exceedingly ungrateful. An organization of the Knights of Labor has recently come into existence in the town, and this is no doubt responsible for the action of the men, as the relations existing between the company and their employees have always been pleasant heretofore. The other departments of the works are not affected and are running full.

Steubenville Furnace, at Steubenville, Ohio, the property of the Riverside Iron Works, at Wheeling, W. Va., was blown in on the 3d inst., after a suspension of operations since May 11 last. At that time the employees made a demand for eight hours' work with 12 hours' pay, which was refused by the company. The men resumed work at the same wages and hours as before the stoppage.

We are in receipt of the following letter, under date of September 1, from the Belaire Nail Works, of Bellaire, Ohio: "Some four months ago we took down our blast furnace, and immediately commenced rebuilding on a larger scale and with more recent improvements. We expect to blow in from the 10th to the 15th of the present month. Our present stack is 75 feet high, 16-foot boshes, four iron stoves, two blowing engines. The product will be Bessemer pig for our own use, and the anticipated capacity is about 150 tons per day. The stack and casting houses are entirely new.

On March 9 last the Jefferson Iron Works furnace was blown in, putting to work the first plant of what is called the Gordon-Whitwell-Copper stove. Gordon, Strobel & Laureau have now placed 20 in all, involving the outlay of nearly \$300,000, as follows: Jefferson Iron Works, three, 17 x 65 feet; Joliet Steel Works, four, 20 x 65 feet; Pratt Coal and Iron Company, three, 21 x 65 feet;

Alice Furnace Company, two, 19 x 55 feet; Vulcan Steel Works, three, 17 x 65 feet; Missouri Furnace Company, two, 19 x 55 feet; North Chicago Rolling Mill, three, 16 x 65 feet. The Joliet Steel Company have two furnaces, each 20 feet diameter and 80 feet high. At one of these there is a plant of Whitwell stoves 20 x 65 feet. Gordon, Strobel & Laureau have lately put at work at the other a plant of their type exactly the same size. Mr. Filby, president of the Missouri Furnace Company, St. Louis, is a director in the Joliet Steel Company, and having all possible opportunity to make fair and reasonable comparisons, he decided to put in the Gordon stoves.

The rail mill of the Springfield Iron Company, Springfield, Ill., which has been idle since January 1, 1883, will start September 15 to October 1 rolling rails from imported blooms. It will have a capacity for about 7500 tons of rails per month.

H. Boyer, Reading, Pa., Chestnut Hill Furnace, reports that they blew out No. 3 Furnace August 20. They are going to make it 60 feet high and add all modern improvements, and expect to blow in again about November 1.

Noble Brothers & Co., at Anniston, Ala., are building a new double puddling furnace, which will carry their capacity to 40 axes per day, single turn.

In the Oregon State courts the Oregon Iron and Steel Company have brought suit against Smith Bros. & Watson to recover property and for an accounting.

New York capitalists have purchased 4000 acres of land, including the town of South Pittsburgh, in Marion County, Tenn., and will erect several iron furnaces and make other investments at that point. The Tennessee Coal, Iron and Railroad Company, in selling the town, retained enough land for the successful operation of their business. The price received was \$300,000 cash.

Machinery.

The Westinghouse Electric Company are fitting up a mammoth testroom at their Pittsburgh manufacturing. A 200-horse power Westinghouse engine will be used for testing dynamos alone, besides a 75-horse power in the shops, and 75-horse power operating a 3-mile circuit on their high-tension incandescent system.

W. R. Eynon & Co., Cleveland, Ohio, have just completed and delivered to the Avery Elevator Bucket Company a large size special die sinking machine, capable of making a die for the largest bucket made, measuring 25 x 9 inches, stamped from solid steel.

The Westinghouse Air-Brake Company have just signed a contract to equip 1000 freight cars of the Colorado Midland with its system of air brakes. This is the first result of the great test at Burlington, Iowa.

Westinghouse engines are now running in England, Scotland, France, Holland, Belgium, Germany, Russia, Cuba, Canada, Central America, Mexico, Argentine Republic, Chili, Australia and Japan. They are also in every State and Territory in the United States except Nevada and the Indian Territory.

The Wainwright Mfg. Company, 65 and 67 Oliver street, Boston, and 93 Liberty street, New York City, have sold exhaust feed-water heaters as follows during the month of August: George H. Little, Peabody, Mass.; Melrose Pumping Station, Melrose, Mass.; Rutland Electric Light Company, Rutland, Vt.; Charles Mullen, Wilmington, Del.; J. N. Bassett, Worcester, Mass.; W. & B. Douglass, Middletown, Conn.; John Post, Jr., & Co., Boston; Matthew Robson, Salem, Mass.; J. A. Wing, Littleton, Mass.; Davidson Steam Pump Company, Brooklyn, and to the Fitchburg Steam Engine Company, Fitchburg, Mass. They have sold their corrugated tube expansion joints to the New York Steam Company and to H. O. Nelson, Knoxville, Tenn. They are still selling large numbers of their corrugated brass tube radiators. They note a great increase in the demand for brass and copper corrugated tubes, and report the trade in wrought-iron pipe and fittings to be good.

The firm of E. E. Carter & Co., who moved their works from Waynesburg to Pittsburgh within the summer, have an order for one of the 4 horse Success engines from Hamburg, Germany. They have filled orders from Portland, Ore., and Denver, Col., and have inquiries from San Francisco. They now occupy the plant of the Knoxville Chain Works, and build portable and stationary engines, and do general foundry and sheet-iron work.

The foundry at the corner of Fifteenth street and Centre avenue, lately operated by Thomas Love, deceased, has been leased from the purchaser, the Chicago and Great Western Railroad, by the Vulcan Iron Works, of this city, and will be known as the Centre avenue foundry department of the Vulcan Iron Works. It will start up with a fair supply of orders, and being specially adapted for heavy work will probably get its share of trade.—*Industrial World, Chicago.*

The Homer Ramsdell Transportation Company, of Newburg, N. Y., have awarded the contracts for constructing the proposed new steel passenger and freight steamer Homer Ramsdell, which is to ply between Newburg and New York as companion boat to the steamer Newburg, recently constructed by Neale & Levy, of Philadelphia. All the work upon the steamer is to be done by Newburg firms. The hull is to be constructed by Thomas S. Marvel & Co., the engine and boilers are to be furnished by William Wright, of the Washington Iron Works, and the joiner-work is to be done by Thomas Shaw's Sons. The Homer Ramsdell is to be 214 feet in length over all, 33 feet breadth of beam, 42 feet over guards and 11 feet depth of hull. She will be run by a vertical compound engine of 1000 horsepower, 26 inch high-pressure and 45-inch low-pressure cylinders, with a 36-inch stroke. She will be fitted with a propeller-wheel of 10 feet diameter, having a 15-foot pitch. The steamer will have two boilers, each 9 feet 6 inches in diameter and 20 feet long, and she will be allowed to carry 100

pounds of steam. It is calculated that the engine will make 110 revolutions per minute. The steamer will have 108 staterooms, saloons and officers' rooms elegantly fitted up, and will be illuminated by electric light and heated throughout by steam. It is expected that the new steamer, upon which work is to be commenced at once, will make 20 miles per hour, and be one of the fastest propellers on the Hudson, equaling the performances of the Newburg and the City of Kingston.

The Peerless Mfg. Company, of Louisville, Ky., have just delivered two of their Rice sand-molding machines to B. F. Avery & Sons, of that city, and will shortly ship a machine to the Vulcan Iron Works, of Toledo, Ohio, for making molds for oil-boxes for railroad cars.

The Automatic Drill Press Company, Chicago, capital stock \$50,000, have been incorporated by Wendelin Seng, Wm. Kreicker and A. P. Skinner. Object, to manufacture drill presses, &c.

Mr. J. S. Glenn, of the Glen Valve Manufacturing Company, Chicago, Ill., has received the order for the hydraulic valves for the Duquesne Steel Company's plant. These valves, which we illustrated some time ago, are rapidly gaining favor. This order was received from Messrs. Mackintosh, Hemphill & Co., Fort Pitt Foundry, Pittsburgh, Pa.

The Hamilton Machine Company, of St. Louis, Mo., have recently made several important shipments of engines, boilers, clay crushers and other machinery to various sections of the West.

The Ring Machine Company have been organized at Portland, Me., to build machinery.

The Clayton Air Compressor Works, of Brooklyn, N. Y., have just shipped to Sydney, Australia, a duplex air compressor. It has two 12-inch steam cylinders; two 8-inch air or gas cylinders and a stroke of 26 inches. The compressor is fitted with all the latest Clayton improvements. It is designed to compress hydrocarbon gas to 300 pounds.

Messrs. Parsons & Landon, manufacturers of iron castings, Bridgeport, Conn., are now working on a large contract for the De La Vergne Refrigerating Machine Company, of New York. They are also largely engaged in making opera-house chair castings and horse-railroad castings, and are now fitting up to enter into the manufacture of piano plates, brackets, pedals, &c.

During the past summer the Pratt & Cady Company, of Hartford, Conn., manufacturers of valves, cocks and gauges, have extended their works by putting up an addition to their shop of 100 x 46 feet, two stories high, and to their brass foundry a building 40 x 70 feet. It has a slate roof with monitor top, and contains 11 new melting furnaces, together with a new 50 horsepower steel tubular boiler built by I. B. Davis & Son, of Hartford. It is also provided with a nickel-plating outfit from Hanson, Van Winkle & Co., of Newark, N. J., enabling them to plate their radiators and finished work. In addition, new tools and machinery have more than doubled the capacity of the Pratt & Cady Company's works, as compared with last year. Their asbestos renewable disk rings, which go into all their valves, are very popular and are getting a strong hold on the market. Their asbestos-packed cocks, which they furnish from 1/4 inch to 8 inches inclusive, are said to be the best, and to stand more hard usage than any cock or valve on the market. They cost more than the common plug cock, but it is claimed, will last many times longer. They are largely used as blow-off cocks for boilers when something tight and reliable is a necessity. Many thousands of them are in use.

Mr. D. B. Cruickshank, machinery dealer of Providence, R. I., reports the following shipments of machinery: A 10 x 24 Corliss engine to Yantic Woolen Company, Yantic, Conn.; a 15-horse-power boiler and a 2-inch rotary pump to Bristol Creamery, Drownville, R. I.; a 34-inch band saw to Saunders & Ring, Providence, R. I.; a 6 x 12 hoisting engine and boiler to Harries Mfg. Company, Phenix, R. I.; a 25-horse-power high-speed engine to J. A. Shipper, Poinsett, Fla.; a 35-horse-power boiler to Sterling Dyeing Company, Sterling, Conn.; a 10 x 24 horizontal engine to Union Paper Mill, Pawtucket, R. I. Mr. Cruickshank reports business fair.

The Universal Radial Drill Company, of Cincinnati, have now in course of construction two new machines, a No. 00 and a No. 3 radial drill. The latter, a very large and heavy drill, will be sent to the United States Navy-Yard, at Brooklyn, N. Y., and will be delivered in a short time.

Hardware.

The Hartford Machine Screw Company, Hartford, Conn., have recently added to their works a department devoted exclusively to the finer grades of screws, &c., such as are used in watches, clocks and optical instruments. They also furnish automatic screw machines for producing work of every description from the smallest watch screws to the heaviest millwork. They have recently supplied a large number of machines for a company located in Halifax, England.

The Wright Wire Cloth Company, Palmer, Mass., are putting in some looms for the manufacture of poultry netting, a line to which they are giving some attention. They are also manufacturing the hardware grades of wire cloth, locomotive spark cloth, &c.

The employees of the Beaver Falls Shovel Works, at Beaver Falls, Pa., have organized a relief association of a character similar to the one now successfully conducted by the workmen of the Hartman Steel Company, Limited, at that place.

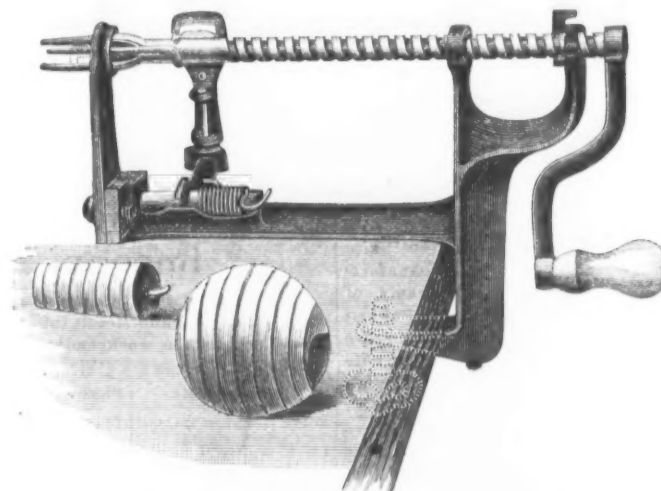
New England Specialty Company, North Easton, Mass., have added to their list of products a line of single and double mincing knives.

The Forsyth Scale Company, of Youngstown, Ohio, inform us that their trade is improving. They have sold more than 50 per cent. more goods this year than in the corresponding period of last year.

NOVELTIES.

The Ideal Apple Parer, Corer and Slicer.

L. A. Sayre, Newark, N. J., is manufacturing this machine, which is represented in the cut given herewith. Attention is directed to the fact that the rod has a deep thread, so that there is no danger of the



The Ideal Apple Parer, Corer and Slicer.

guide slipping out. The guide is thrown out of position by the handle when the apple is finished, thus permitting the rod to be drawn back by a single motion, when the push-off expels the core automatically. The simplicity and the efficiency of the action of this push-off are also alluded to.

The Empire Sash Pulley.

The illustrations, Figs. 1 and 2, represent this article, which is manufactured by the Empire Portable Forge Company, Cohoes, N. Y. Its general features will be understood without detailed explanation. It will be seen that it has no face-plate and does

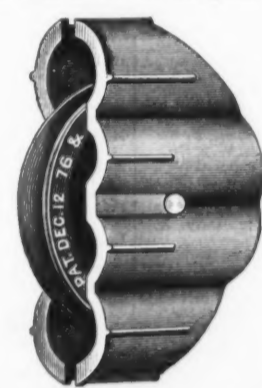


Fig. 1.—The Empire Sash Pulley.

not require any screws. The mortising is done with a 7/8 inch auger bit, and requires, it will be perceived, only four holes. The centers of the holes are marked without the use of gauge or center marker, by laying the points of the ribs on the line which is to be the width of the mortise and tapping with a light hammer. When boring from the exact centers four straight parallel holes the pulley may be inserted and driven home, a small block being used to protect the edges. It is claimed that the pulley will then be securely held and cannot get away, as the shrinkage of the wood will clasp it tightly, but if it is desired to make it more secure small brads or nails may be driven diagonally in the

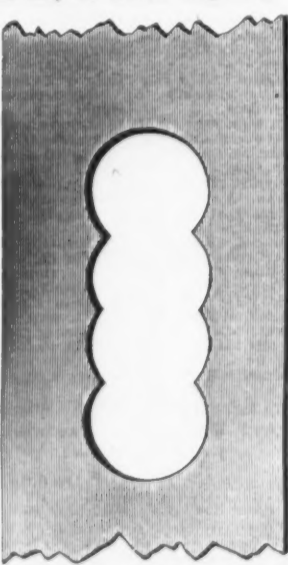


Fig. 2.—Mortise for Sash Pulley.

case through the slots at each end. These pulleys are made with 1/4-inch steel axles, with plain face, unground wheel; plain face, polished wheel; bronzed and polished face and wheel and nickel-plated and polished face and wheel, and are described as of the best material and strong and durable.

New Steam Washer.

The illustrations, Figs. 1 and 2, given herewith represent the steam washer made by Silver & Co., 56 Warren street, New York, Fig. 1 showing it in connection with stove, and Fig. 2 giving a sectional view and illustrating some of its special features. The washer, as will be seen from the cut, consists of a tank in which is fixed, and completely enveloped by it, a revolving drum, the bottom of which passes through the water, and by means of buckets, A and B, Fig. 2, attached to four horizontal slits, with which the periphery of the drum

is pierced, and through which the steam enters, a certain quantity of the boiling water is scooped up with each rotation of the drum, and carried along until it reaches the top or highest point of the circle, when it is discharged in a stream on the clothes. This is for the purpose of removing all particles of dirt which the action of the steam has loosened, the water discharged from the buckets finding its way back to



Fig. 1.—Silver & Co.'s Steam Washer.

feature, the application of boiling water in small streams to the linen while under the action of the steam, is the one upon the value of which the manufacturers lay

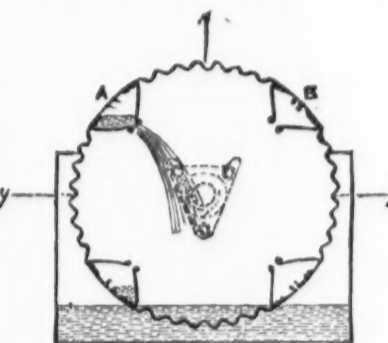


Fig. 2.—Sectional View of Washer.

special emphasis, while they also allude to the many advantages connected with the use of this machine. The machines are described as made of heavy block tin plate, and their strength and durability alluded to.

A gentleman connected with the Mexican legation, just returned from Mexico, says the grave question in Mexico now is the depreciation of silver. This metal is the principal export of the country, and it has gone down in value so much that all foreign merchandise has advanced in price 50 per cent. Most merchants have suspended their orders for foreign goods, and those who are compelled to make purchases in foreign markets ship the silver and deposit it as collateral, borrowing money upon it on 3 per cent. interest to meet their obligations. In the City of Mexico exchange on New York costs 38 1/2 to 39 per cent. This state of things is greatly stimulating a desire for the introduction of manufactures and an increase in the shipments of natural products, such as sisal, vanilla, mahogany and other ornamental woods, hides and skins. The Government is doing everything possible to encourage exportations, and has made contracts with steamship companies doing business with New York, Havana and Europe to carry Mexican products at low rates of freight.

In a large candle factory in Simmering, near Vienna, copper-smiths were repairing with solder a copper vat in the fat-rendering room, when in some way fire was communicated from one of the portable soldering furnaces to a tank of liquid fat which stood near at hand. Instantly the grease ignited, a great column of flame rose up to the roof of the one-story building, and spread rapidly through the extensive works. After several hours' exertion the fire was got under control, but a large portion of the candle works was destroyed.

Chattanooga.

Office of The Iron Age, Carter and Ninth Sts.,
CHATTANOOGA, September 6, 1886.

The natural disturbances of the past week have not in any manner affected the general tone of business, and everything is moving along with its usual spirit and energy, with a tendency to an increase in volume, especially in the manufacturing lines. One of the best indications of the amount of business that a country is doing is represented by the amount of freight that is being carried by the railroad lines, which have now got to a point that the volume of it is simply embarrassing to many of the lines. Orders are being known to lay on the hands of the producer from 10 to 12 days waiting cars to ship, and the outlook is now that the roads will be compelled to largely increase their rolling stock to accommodate the patrons of their respective lines. The situation of many of our manufacturers may be illustrated in the reply of one of our largest manufacturers when solicited for an advertisement: "I do not want to advertise. I do not want any agents out soliciting orders, and I really hope we will not receive an order for three months. I am simply sick and tired out by being drove as I am and have been for the last three months in my efforts to fill the orders that have been coming in." This same party, who are manufacturers of furniture, are now building another factory at a cost of about \$15,000, which will, of course, largely increase their capacity. During the past week five manufacturing sites were sold on the line of what is known as the Belt Railroad to parties from the North with a view of putting up small manufacturing establishments.

Pig Iron.—There is nothing of particular interest to speak of in this line beyond the fact that producers are meeting with ready sales for their output at prices that average something more than a few weeks ago. The question of a stiffness of the market is now fully established beyond a doubt, and the demands are of such a character as to render the producers quite easy as regards the future. Many of the furnaces are endeavoring to run on Nos. 2 and 3, which are grades that find the readiest sale in all the principal markets, and \$12.50 @ \$13.75 is a fair average. Shipments of all grades during the past week have been very heavy to Eastern points via the seaboard, and aggregate about 2700 tons during the week. The Southern foundries are beginning to anticipate their wants for the fall business, and are buying quite freely.

Lumber.—While this market has for some time been favorably known as an extensive lumber market, it has been but recently developed into a furniture manufacturing center, also manufacturing of Sash, Doors and Blinds. There are no less than seven large establishments now engaged in this occupation, but another will go into operation in about 10 days, and another in about six weeks. The number of hands now employed will aggregate about 1200, and the shipments will run from 15 to 30 carloads per day into nearly every section of the United States. Should this industry continue to increase in the future in the same ratio as in the past it bids fair to overshadow in volume the business of which Chattanooga has become famous—i. e., the manipulation of Iron and cognate industries.

Miscellaneous.—The alterations that are being made in the works of the Roan Iron Company with a view of turning them into a Steel plant for the manufacture of Rails, of which mention was made in the columns of *The Iron Age* some weeks since, is rapidly nearing completion, and the management expect to be turning out Rails some time in November. This event will be worthy of note in the history of Iron-making in the Southern States, and its success will be looked upon with much interest by the Steel-making fraternity of the United States.

Baltimore.

W. N. WYETH, Iron and Steel merchant, 46 and 48 South Charles street, reports us the following, under date of September 6: Since our last report, and as therein stated, trade has much improved, both inquiry and demand causing the result. Values, however, remains about as then quoted. This improvement is not confined to local wants, but is coming from all tributary territory, and from the outlook seemingly permanent—in other words, the result of long stagnation. We quote the list nominally at annexed figures:

Ref. Bar Iron, 1 to 6 x 1/2 to 1... \$1.80 @ 2
" " " 1 to 4 1/2 x 1 1/2 to 1... \$1.80 @ 2
" " " 3/4 to 2, Round... \$1.80 @ 2
" " " 1/2 to 1, Square... \$1.80 @ 2
Hoop Iron, 14 wide and upward... \$2.30 @ 3 1/2
Band Iron, from 1 1/2 to 6 in. wide... \$2.30 @ 3 1/2
Horse Shoe Iron... \$2.50 @ 4
Norway Nail Rods... \$5 @ 5 1/2
Black Diamond Cast Steel... \$9 @ 10
Machinery Steel... \$3 1/2 @ 4 1/2
Spring Steel... \$3 1/2 @ 4 1/2
Common Horse Nails... \$8 @ 9
Railroad Spikes, 5 1/2 x 9-16... \$2.30 @ 2 1/2
Perkins's Horse Shoes, 9 keg of 100 B... \$3.50
Mule Shoes... \$4.50
Boiler Tubes... \$2 1/2 off list

Detroit.

CHARLES HINCHES & Co., dealers in Pig Iron, Detroit, Mich., report, under date of September 6, as follows: A still more hopeful feeling, based upon present and prospective demand and actual short stocks on hand at the furnaces, is being felt in the entire Pig-Iron market; there is scarcely an exception. Lake Superior Charcoal Iron leads the list in firmness, followed by Southern Coke Irons. Inquiry is again being made for rather larger quantities than had

been expected, considering the fact that nearly all of the largest buyers had placed their orders for this year. It looks now as if it was a question of but a short time before this quite firm feeling which we have noted shall take the form of an actual advance. There is not a furnace in the Lake Superior district to-day that has a large stock of Iron on hand. Old Rails are in active demand and scarce, prices being firm as quoted below. There is some inquiry for Old Wheels, which seem hard to get at market rates. We quote as follows:

Lake Superior Charcoal, all numbers...	\$21.50 @ \$22.50
Lake Superior Coke, All Ore...	20.00 @ 21.00
Lake Superior Coke, Cinder Mixed...	18.00 @ 19.00
Standard Ohio Blackband...	20.00 @ 21.00
Southern No. 2...	17.00 @ 17.50
Southern Silvery, Open...	17.00 @ 17.50
Southern Silvery, Close...	16.50 @ 17.00
Jackson County, Ohio, Silvery...	18.00 @ 19.00
American Old Iron Rails...	21.00 @ 22.00
Old Wheels...	16.50 @ 17.50

Imports.

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending September 15, 1886:

Hardware.	Phelps, Dodge & Co.
Baker Hermann & Co.	Sheets, bxs., 37
Cutlery, cs., 13	Pierston C. L. & Co.
Clark, Walter L.	Pig, tons, 22
Mach'y, cs., 8	Stetson Geo. W. & Co.
Downing & Co.	Pig, tons, 250
Ironware, pkgs., 30	Williamson Jas. & Co.
Drexel, Morgan & Co.	Pig, tons, 100
Arms, cs., 56	Order.
Field A. & Co.	Bundles, 350
Chains, cs., 14	Rods, bales, 2819
Folsom, H. & D.	Pig, tons, 150
Arms, cs., 13	Tubes, 405
Gerard Otto.	Cotton ties, bbls., 200
Bales, 129	Spiegel, tons, 500
Godfrey, J. C.	Coiled rods, bbls., 391
Arms, cs., 11	Ties, bbls., 2300
Hart, A. H. & Co.	Rods, bbls., 78
Mach'y, pkgs., 8	Ore, tons, 2100
Hartley & Graham.	Fish plates, bbls., 32
Arms, cs., 64	
Mdse., cs., 20	
Junge, H.	
Cases, 3	
Kastor, A.	
Cutlery, cs., 3	
Knauth, Nachod & Co.	
Arms, case, 1	
Lau, J. H. & Co.	
Arms, cs., 6	
Legget & Co.	
Oil stones, cks., 60	
McCoy & Sanders.	
Cases, 6	
Merch. Desp. Co.	
Arms, cs., 7	
Moore's Sons, J. P.	
Arms, cs., 5	
Mdse., cs., 8	
Ogden Wallace.	
Mach'y, cs., 2	
Sallenbach, W. & Co.	
Mach'y, cs., 19	
Sheldon G. W. & Co.	
Cases, 73	
Cutlery, cs., 2	
Schoverling, Daly & Gales.	
Arms, cs., 23	
Mdse., cs., 20	
Schutte, W. & Co.	
Cases, 13	
Schulz & Ruckzater.	
Iron barrels, 30	
Mach'y, cs., 2	
Smith & Sons.	
Mach'y, cs., 5	
Smith, J. P.	
Oil tones, cks., 350	
Taylor, Thos.	
Case, 1	
Thurnauer, G. M.	
Cases, 16	
Van der Toor.	
Arms, cs., 2	
Vom Clief & Co.	
Cutlery, cs., 4	
Wheeler, F. A.	
Mach'y, box, 1	
Wiesbusch & Huber.	
Arms, cs., 37	
Cases, 23	
Witte, John G. & Bro.	
Cutlery, cs., 13	
Order.	
Nails, kegs, 5	
Cases, 2	
Mach'y, cs., 100	
Mach'y, pkgs., 4	
Cutlery, cs., 2	
Cases, 3	
Bolts, kegs, 5	
Iron.	
Baring Bros. & Co.	
Wire rods, coils, 2351	
Brown Bros. & Co.	
Bars, 1729	
Coddington T. B. & Co.	
Sheets, bbls., 373	
Crocker Bros.	
Pig, tons, 200	
Ferro iron, tons, 200	
Tons, 286	
German Atlas.	
Bundles, 129	
Bales, 15	
Lundberg Gust.	
Bars, 12,600	
Bundles, 455	
Rivet rods, coils, 489	
Mason John W. & Co.	
Wire rope, reel, 1	
Miller, Schall & Co.	
Rivet wire rods, coils, 251	
Naylor & Co.	
Spiegel, lot, 1	
Metals.	
Alexandre & Co.	
Q'silver, bbls., 1100	
Boestend & Co.	
Tin, slabs, 1070	
Bruce & Cook.	
Tin plates, bxs., 463	
Coombs, Gosby & Co.	
Brassware, cs., 3	
DeMitt H. R. & Co.	
Tin plates, bxs., 334	
Hughes & Lanchester.	
Tin plates, bxs., 520	
Galway & Cassado.	
Lead, pigs, 400	
Gould, R. S.	
Brassware, cs., 7	
Lamarque H. & Co.	
Roller zinc, cs., 18	
Phelps, Dodge & Co.	
Tin plates, bxs., 7078	
Wheeler, Fellows & Co.	
Tin plates, bxs., 617	
Order.	
Tinplates, bxs., 16,677	
Tin, ingots, 725	
Tin, slabs, 1897	
Antimony cks., 60	
Lead, slabs, 352	
Tin slabs, 300	
Spelter plates, 10,667	
Tin plates and ingots, bxs., 840	
Ingot copper, cs., 50	

The imports at this port of Cutlery, Hardware and Metals during the week ending September 3 were as follows:

	Quantity.	Value.
Anvils...	162	\$1,000
Brass goods...	99	8,670
Bismuth...	8	4,630
Bronzes...	54	5,405
Chain and anchors...	49	2,429
Copper...	140	26,353
Cutlery...	140	26,353
Clocks...	64	7,545
Dutch metal...	32	5,500
Electrotype...	28	134
Guns...	1	6,724
Gun wads...	2	74
Hardware...	1	202
Iron, pig, tons...	2,065	92,707
Iron, sheet, tons...	59	8,191
Iron, spiegel, tons...	3,963	71,267
Iron ore, tons...	568	9,674
Iron, cotton ties...	2,300	1,363
Iron, other, tons...	794	29,976
Lead, pigs...	4,306	15,287
Metal goods...	316	85,272
Machinery...	175	6,772
Needles...	16	4,498
Nickel...	6	729
Old metal...	181	181
Patina...	2	5,441
Plated ware...	39	1,821
Percussion caps...	62	8,497
Pins...	30	2,304
Plumbago...	337	12,848
Quicksilver...	316	6,772
Regulus antimony...	320	11,176
Saddlery...	5	179
Steel...	29,568	45,956
Spelter...	35,977	1,596
Silverware...	7	685
Tin, bxs...	2,391	9,676
Tin, slabs, 13,314 B...	1,406,928	229,641
Wire...	7	1,478
Zinc, oxide...	56	445

Obituary.

John Fry died at his home near Lime Rock, Conn., on August 30. Mr. Fry was one of the oldest furnace managers in that region, having learned the business while employed by Mr. N. Gridley more than 50 years ago. He built and owned the furnace at Shaftsbury, Vt., and for many years had charge of the furnace of the Barnum-Richardson Company.

Mr. Samuel H. Jack, for a number of years past connected with the Black Diamond Steel Works (Park Bros. & Co.), and well known in iron and steel circles, died on Thursday, September 2, after a short illness. Deceased was also for a number of years in the employ of Zug & Co., of Pittsburgh, and acted as traveling salesman for both of the above firms.

Twin-Screw Vessels.

In discussing Mr. W. John's paper on "Atlantic Steamers," recently read before the British Institution of Naval Architects, reference was made to the advantages of twin screws for vessels. It was remarked that when a ship with twin screws was being handled in dock there was greater maneuvering power, and therefore less liability for the ship to come in contact with the walls, although if she did so there would be greater probability of damage to the propellers. Means could, however, be devised of protecting the screws when the ship was in dock. Another of the incidental advantages connected with twin screws was that smaller engines and smaller propellers were required, and therefore they might run them at a higher speed. They would also get lighter machinery with twin screws, and there would be less liability to have bad castings and forgings in the smaller engines, and of course the cost would be less.

The Launch Henrietta.—The extraordinary run of the little nautical wonder, Henrietta, last week, is the chief topic of conversation in yachting circles. Her marvelous speeds have hitherto all been made over short distances, and it was believed generally that she could not keep up her tremendous spurts when the distance was over 100 miles. In order to test this point a run was made on the 3d inst. from Catskill Landing to Sandy Hook. According to available reports the trip was made in 7 hours 2 minutes, which, deducting the 22 minutes' stoppage at Newburg, makes the actual time from Catskill to Sandy Hook, a distance of 133 1/2 miles, 6 hours 40 minutes, or at the rate of 20 1/2 miles per hour.

An international exhibition has been proposed for Barcelona, Spain, to open in September, 1887, and to close in April, 1888, thus occupying the winter half of the year. A company is being formed to promote it, and it will include agricultural, industrial and commercial products, with special sections for marine, electrical, therapeutical and artistic exhibits.

New Orleans is said to have more arc lights in proportion to the population than any other city. There are 1800 in action every night, and the cost is a fraction under 32 cents each per night.

Love Bros., of Aurora, Ill., have on hand a large number of orders for castings, one for a new brewery in Aurora of 65 tons, besides 100 tons of building work for a city concern. They are employing about 40 men.

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The superiority of our Horse Rasps over all others is universally admitted by those who use them, and their high degree of excellence will be scrupulously maintained. Give them a trial, and see no other.

THE "ALLARD" SPIRAL SCREW DRIVER.

Best Quality of Material. Superior Workmanship.

Blades are made of the finest Steel and tempered with great care, so they will not crumble nor turn. Warranted throughout.

The Screw Driver herewith represented is designed more especially for light and rapid work, and for the use of those mechanics who have large quantities of small screws to drive. They are invaluable, saving many times their cost in an incredibly short time.

Machinists, Gun and Lock Smiths, Cabinet-makers, Coffin-makers, Carriage-makers and all other manufacturers and mechanics who have large numbers of screws to drive will find it a very convenient tool for running in light machine screws.

No tiresome turning of the hand and twisting of the wrist. Press forward, and the spiral turns the screws.

Be sure you get the original "Allard," and not an imitation or inferior imitation so-called spiral screw driver.

PRICE LIST.

No. 1—Brass Cylinder and Black Walnut Handle—Retail, \$2.25 each, net; \$27.00 per doz. No. 2—Nickel-plated Cylinder, Rosewood Handle—\$2.50 each, net; \$30.00 per doz. No. 3—Nickel-plated Cylinder, Rosewood Handle, small size—\$2.50 each, net; \$30.00 per doz. Trade Discount, 25%. Terms, 60 days, or 2% off for cash, 10 days, Cash, Factory or New York.

N. B.—May be ordered from your nearest Jobber in all the principal cities throughout the United States and Canada, who will supply you at above discount, thus saving freight charges. A sample by mail at above price.

Manufactured by F. A. HOWARD.

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Sept. 4, 1886.

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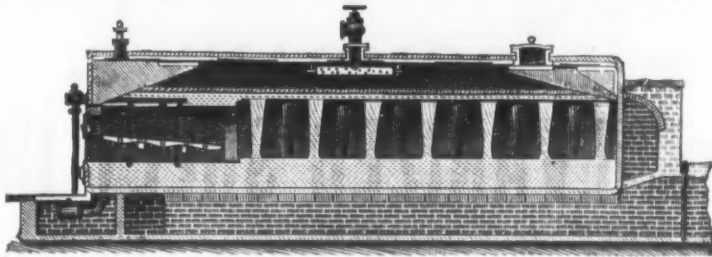
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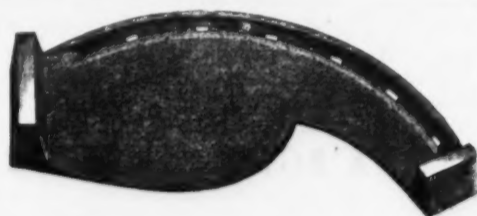
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The Production of Welding Steel for Tube Purposes in the Bessemer Converter.

To the Editor of The Iron Age.—SIR: Bessemer steel has taken the place of iron in every branch of manufacture where iron has been extensively used, except in the manufacture of tubing. That Bessemer steel would make a better, stronger and cheaper tube cannot be denied, but the trouble has been to secure a quality of steel that will admit of being welded by the mechanical appliances found necessary in this particular branch of manufacture. It is not only difficult, but it is absolutely impossible to procure a suitable quality of steel. The only reason apparent to the writer why steel of this quality cannot be had is the inability of steel manufacturers to manufacture it in sufficient quantities. To make the assertion that the process is not adapted to producing this quality of steel would, to say the least, be making an assertion that experience has proven to be erroneous. It is certain that tubes of the very best quality have been made from Bessemer steel. This at once proves beyond a reasonable doubt that the fault is not in the process, but in the practice. I have seen Bessemer-steel tubes that stood the severest tests, but the firm that furnished the steel found it quite difficult, if not impossible, to manufacture this quality of steel in anything like commercial quantities. In fact, it appeared to be a chance blow from which the tubes in question were made.

Tube as well as Bessemer manufacturers appear to believe the difficulty to be solely a chemical one; consequently expect to reach the desired end through the aid of chemistry. Quite often the remark is made (and sometimes by Bessemer men) that steel to weld properly and come up to all the necessary requirements in the manufacture of tubes must be of such and such quality or have a certain amount of carbon, manganese, silicon, sulphur and phosphorus in certain proportion. Doubtless these elements as well as others have a great deal to do with the quality of the steel, and to a certain degree control it. But to say that they alone control quality is an erroneous statement. Two pieces of steel from different blows with practically the same amount of these elements will often behave quite differently in the forge and show radically different physical tests. On the other hand, samples from two blows whose analyses may be widely different when subjected to a physical test will frequently show good results in both cases. Judging from these facts it is evident that the quality of steel does not depend entirely on its chemical composition. Or, in other words, the same quantity of the elements usually found in Bessemer steel does not insure like physical results, and consequently cannot be taken as a final index to its quality.

As I understand it the trouble has been in the welding. To be a success the steel must be of such quality as will admit of being heated to the required temperature without affecting the quality of the steel or in any way affecting the strength of the finished tubes. To produce a steel of this quality is where the difficulty exists. This will certainly require more care and attention than steel for rails, nails, wire rods, or, in fact, almost any other kind yet produced by the Bessemer converter. This is so, simply because this steel must be strictly uniform in every particular and at the same time admit of being welded by the mechanical appliances in the manufacture of tubes without the assistance of flux or hammer. In order to substitute Bessemer steel for iron in the manufacture of tubes it must possess this most essential and indispensable quality—welding—in the very highest possible degree. There is no question but that there is something apparently mysterious surrounding the manufacture of welding steel, and that the highest authorities disagree in their attempts to solve this problem. I do not intend to give my opinion or say what course I would advocate in order to produce this quality of steel. Suffice it to say that it is my opinion that if ever the problem is solved it must be done otherwise than by the present system or method of conducting such experiments.

The present method of conducting the manufacture is, in my judgment, very poor. In fact, it may more truthfully, and perhaps more correctly, be termed lack of method, for such it is. The practice of conducting a series of chemical analyses that have been in use for years before the manufacture of welding steel was thought of is certainly quite strange. I believe that a correct analysis of the finished steel is of much value to the manufacturer and buyer, but so far as it aids in determining the cause of the apparently mysterious behavior of the different elements in the production of welding steel it is of little consequence. For it is quite evident that causes of the chemical reactions that change and produce different chemical and physical results are more important to those conducting the conversion than the composition of the finished product. It is a very easy matter to say that steel of a certain quality must contain a certain quantity of manganese, carbon, &c. But to get in this amount under certain conditions that must necessarily be observed does require more practical knowledge and judgment than is derived from the mere analysis of the finished steel, and more by far than most blowers possess. I do not wish the reader to infer from this assertion that I think those holding higher positions—chemists included—possess any more knowledge in regard to this matter of producing welding steel than the blowers, for it is an acknowledged fact that when it comes down to real practical knowledge they know less by far than the blowers. Of course there are some exceptions, but these are few indeed. The one thing that surprises me most is that the results have been so good. It is certainly astonishing how most Bessemer men adhere to old methods and practices, which were and are good in the manufacture of rail steel, but bad in the manufacture of steel of this kind. Radical changes in quality must necessarily be brought about by radical changes in method and practice. So, in conclusion, if the manu-

facturers of Bessemer steel ever expect to make this quality of steel a success they certainly will have to make some radical changes in the present method of manufacture. Then, and only then, must they expect success. S. McDONALD. BENWOOD, W. VA., September 3, 1886.

The Mineral Commission of Michigan on the Gogebic Range.

Mr. C. D. Lawton, Mineral Commissioner of Michigan, writes as follows to the *Pick and Ape*:

The Gogebic iron range is much more extensive than was at first supposed. There are two remarkable deposits of ore; profitable mines are found and will continue to be found for a greater distance than was heretofore looked for. The iron bearing formation has considerable width and a long stretch east and west, and it seems to hold favorable indications of iron throughout its whole extent. The remarkable fact relating to this range is that the ore wherever found is uniformly of good quality—not all equally good, of course, but generally clean, high up in iron and low in phosphorus. So that in the matter of the quality of the ore found in this district there is entire security left—the anxiety is to find it at all and then in quantity. Apparently the "finds" are sufficiently frequent. They make excitement enough, and keep the air vibrating with the music of speculation, but there has been so much said of this region, so much that this unreal and exaggerated, that one who has given credence to all that has come to his ears, and that has allowed his anticipations to take too high a range regarding the magnitude of the ore deposits, many suffer disappointment. They may appear to him in reality more limited, apparently, than he had been led to expect. Certainly no Lake Superior man familiar with the early developments in the Marquette and the Menominee districts can find anything in this particular to astonish him. In the leading mines of the Menominee district, when originally opened, more ore was displayed than is to be seen in the Gogebic mines at the same stage of development. Still the deposits here are of good magnitude, and I think that the indications are all favorable for their continuance. I certainly can see no cause to apprehend a speedy exhaustion of these ore deposits; no reason but to believe that they will continue through many years to find ore in such supply as a fair interpretation of the present indications will warrant. And now that I am writing I would willingly say a word of some of the mines, but will only embrace the opportunity to write briefly of the Colby, which has since recently filled a larger measure of the public attention than any other mine in the State.

The Colby Mine, like the other mines of this range, affords excellent ore—clean, beautiful ore, about 60 per cent. in iron in the furnace and low in phosphorus—a fine Bessemer ore that is greatly prized by all furnacemen who are so fortunate as to obtain it. It was a phenomenal deposit from the unprecedented quantity that was got out in so brief a time, with so little labor and at so low a cost. The history of Lake Superior mining affords no other instance to compare with it—one where so much good ore has been so cheaply obtained. Thus far the work has all been plain sailing. The company have mined the ore in the two deposits [the north and south veins or lodes—Ed.], advancing from the west toward the east, and trammed it out directly to the railroad from the stopes. No mining could be cheaper or more simple. But the company are beginning to encounter some of the difficulties that eventually must be incident to all mining enterprises. Especially is this true in the south deposit, where the rock has come in from the hanging wall at the east end to cut out the ore. Drifts into the foot wall discover the ore in quantity equal to the amount lost in the open cut, but the serious question arises how best to attack it. It is covered by a great overlying burden of rock that has little sustaining power in itself. It is made up of slips that drop down as fast as the support is removed. The Colby has in this deposit for the future all the perplexities that any one cares to encounter in his work. The south deposit is a fine one—an immense chimney of ore pitching down to the east at an angle of about 25° with the horizon. It is clean ore, 75 to 100 feet in height. Above its vertical section is a capping of rock 25 to 30 feet in thickness. It is possible that these two deposits of ore—the north and south deposit—may come into one at a greater depth, a hope that is entertained by the management and for which there are some evidences in favor. The Norrie, another of the mines of magnitude on the range, is wholly underground, and will, as the management state, easily get out a product of 100,000 to 120,000 tons of ore the present season. It is to be hoped that the mistakes that have been made in underground work in hematite mining elsewhere may be avoided in this new district.

The engines of the Etruria, of the Cunard Line, have one high-pressure cylinder 71 inches, and two low-pressure cylinders 105 inches in diameter, with a stroke of 6 feet. She has 72 furnaces, and the working pressure is 110 pounds. Her engines make about 65 revolutions, or a piston speed of 780 feet per minute. It is impossible to look at these engines without remarking the enormous gap which separates them from the typical steam engine of books, and indeed of very many makers. The use of piston-valves of huge dimensions seems to multiply the number of cylinders, and the great number of adjuncts serves to complicate the whole machine, until even a trained engineer stands bewildered before them.

A Sheffield manufacturer who has just returned from an extended tour in Canada and the United States tells a correspondent of the *Engineer* that his country has not Germany to fear, but America. He was surprised to find on every side the immense strides the Americans had made, readily adapting machinery to almost every article, and thus producing goods at prices at which the British manufacturer could not possibly place them before the trade.



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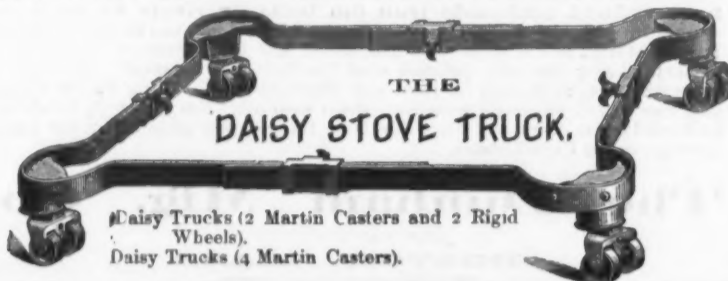
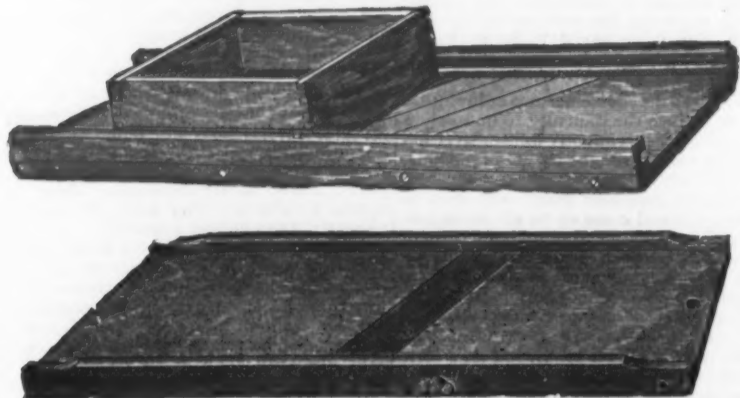
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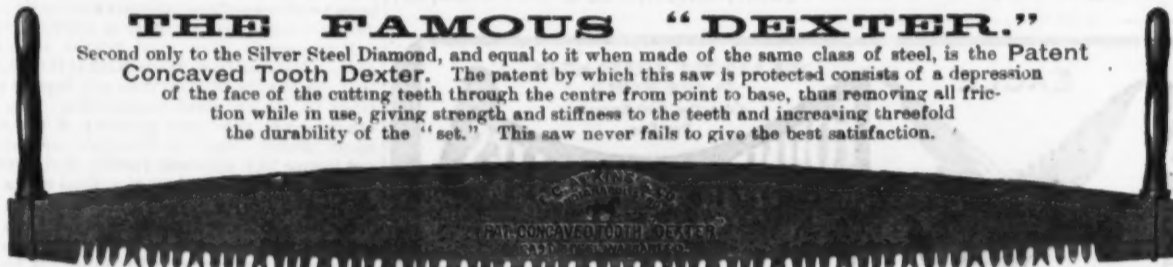
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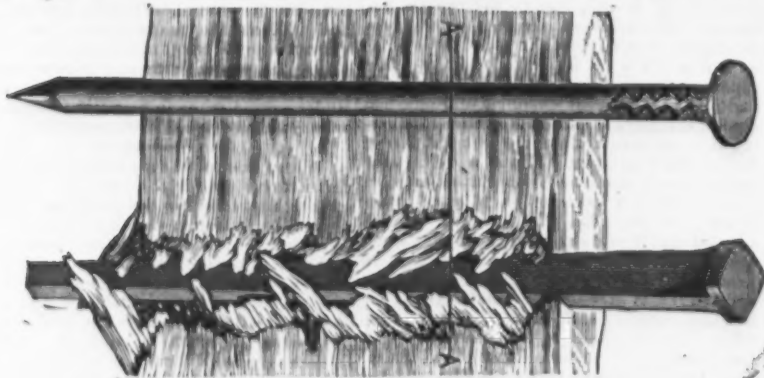


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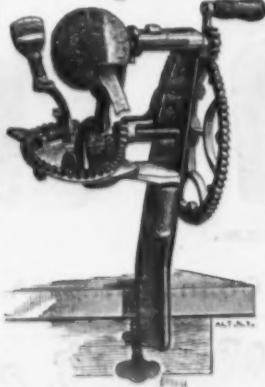


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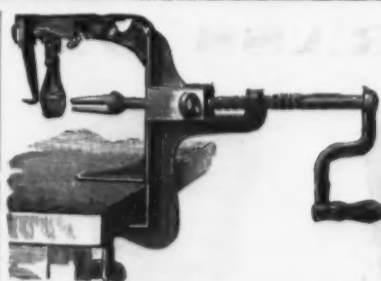
Pares an apple by only two turns of the crank, instead of five, as with a one-knife parer; is doubly durable, having two knives. Has a very simple, noiseless push off; does the best possible work. Warranted satisfactory.

PRICE,
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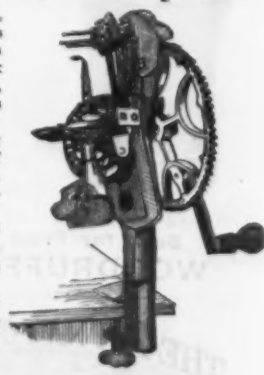
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The Preservation of Wood.

P. H. Dudley closes an article in the
Popular Science Monthly, upon "Woods and
Their Destructive Fungi," with the follow-
ing interesting paragraphs:

One important aid in the preservation of
timber will be, for those whose duty it is to
care for it, to acquire more practical knowl-
edge of the fungi which grow on it, and this
is not a difficult task. What is needed is
to call the attention of the men to the
conditions and to the prevention of the
growth of fungi. The literature about it is
meager, only foreign text-books having
been published which describe the general
species. Prof. Charles H. Peck, in the re-
ports to the New York State Museum of
Natural History, from the 23d to the 38th,
inclusive, has described a great many
species of fungi, and has made the most im-
portant American publications to date. For
practical use he has done a valuable work in
the collection and mounting, in the State
Herbarium, at Albany, of over 2600 species,
where one can in a short time learn to
identify the ordinary species found upon trees
and timber. In the Columbia College Her-
barium these is a collection of nearly 3000
species of the general fungi of this vicinity,
which is also open for study. The facilities
for taking up the practical work are abun-
dant. Every railway company has men of
sufficient aptitude to learn to identify species
and study their conditions of growth and
form, from the materials which can be found
upon every mile of their lines, collections of
decayed wood, from which the employees can
gain knowledge to be put into daily practice
to check much of the unnecessary decay of
all their woodwork of ties, bridges, cars
and buildings. The cheapest operation to
protect our woods, and quite sufficient for
many purposes, is to season or thoroughly
dry the timber, reducing the contained
moisture from 8 to 12 per cent. of the weight
of the wood, and when in this condition,
with a circulation of air around it, to pre-
vent the collection and absorption of moist-
ure, the wood will last indefinitely, as the
fungi cannot grow in such surroundings.
Every one is more or less familiar with the
soundness of timber in the upper part of
buildings, while in lower parts near the
foundations it is often decayed on account
of moisture.

In many situations, however, where tim-
ber must be used the conditions of growth
of the fungi are present and it will decay.
Some species can be used which resist the
attacks of the fungi for a long period, but
the final result is decay unless the wood is
treated by some process preventing the
growth of the fungi, which must be capable
of doing either one of two things: 1. It
must keep the fibers dry, preventing the ab-
sorption of moisture. 2. If the wood must
be in a damp place and kept moist, some an-
tiseptic must be present sufficient to prevent
the growth of any of the various kinds of
destructive fungi. Timber entirely sub-
merged does not come under these consid-
erations. To use the first process successfully
means more than a thin coat of paint or tar
on seasoned wood when exposed to contin-
ued moisture. It must be some substance
which penetrates the tissues of the wood
sufficiently far, in case the exterior sur-
face is broken, to prevent any absorp-
tion of moisture. Wood impregnated with
the heavy tar or lighter oils are protected
more from the fact of prevention of access
of dampness to the fibers than by the con-
tained antiseptics, unless in the exception
of a great percentage of creosote. In the
second method the moisture is permitted to
come in contact with the fibers of the wood,
and reliance depends upon the antiseptic.
In this case the entire wood should be sat-
urated to give the greatest measure of suc-
cess, not merely an exterior protection of
1/2 inch or so in depth, the latter fact, as
before explained, being the cause of many
of the failures which have taken place. The
antiseptic treatment, to succeed, must de-
stroy all the germs which have found lodg-
ment in the timber, and also those which
may come from the exterior.

In a general paper I can only indicate the
antiseptics which have been fairly suc-
cessful, though in many cases the failures were
due not so much to the antiseptic used as to
the faulty manner of application, which can
be understood from what has been written.
The four antiseptics which are most used
now are chloride of zinc, creosote, corrosive
sublimite and sulphate of copper; sulphate
of iron and pyroligneous acid may be men-
tioned. The treatment of the wood by bi-
chloride of mercury (corrosive sublimite) was
called kyanizing; by chloride of zinc, bur-
nettizing; by creosote, creosoting or the
Bethel process; by sulphate of copper, Bou-
cherie's process. Sulphate of copper has
been used for over a century in preserving
timber, and when well applied the results
have been good. The idea of Boucherie was
to force the antiseptic through all the wood
cells, which was correct and the method
successful in proportion to the extent it was
accomplished.

The attempts to impregnate wood are
made now with nearly all of the antiseptics
in large cylinders capable of sustaining from
200 to 300 pounds of pressure per square
inch, one end of which can be opened and
closed for admission and withdrawal of tim-
ber. When the cylinders are filled with the
timber they are closed, then steam or heat
is applied to vaporize the sap or moisture;
after this a partial vacuum is produced and
sustained for from 6 to 12 hours, then the
moisture is withdrawn from the cylinders
and the antiseptic is pumped in and raised
to a pressure of from 120 to 150 pounds,
which is maintained for from 6 to 24 hours.
Porous woods are impregnated quite readily,
while the heart wood of the yellow pine and
the white oak are not penetrated so easily
and take longer time. The external pres-
sure may be 150 pounds per square inch, yet
the hydrostatic pressure in the cavities
of the cells, not 0.0001 inch in area, is
quite small, the impregnation being to a
great extent by capillary attraction and ab-
sorption through the cell walls.

It is evident from preceding statements
and illustrations that untreated railway ties
in the road-bed are of necessity in about as
favorable conditions for the growth of the
fungi as could be selected, and consequent
decay is not only probable, but certain and

rapid. Ties of the most durable woods as a
rule only resist decay for from 8 to 10 years,
while inferior qualities only last from four to
seven years.

Educational Engineering Books.

In a recent issue the *Engineer* (London)
presents an article on "Educational En-
gineering Books" which deserves the closest
attention. The subject taken up is obviously
of current interest and importance, and we
commend the *Engineer's* treatment of it to
our readers. We quote:

The field of the engineer's labors, whether
in what are usually designated civil depart-
ments or in mechanics, yearly extends its
boundaries, and the intending student of
the present day has more to perplex him in
selecting which departments of the profes-
sion he will study than had his predecessors
of, we may say, half a generation back.
With increasing knowledge comes an in-
crease of literature professing to instruct.
Much of it, however, tends rather to con-
fuse than to teach, and ought not, therefore,
have ever been written. While, on the one
hand, the student of to-day has far more to
learn than he of past times, the time avail-
able for study remains the same, and is,
moreover, a more valuable commodity.
Hence it follows that the means of instruc-
tion ought to be the best possible. Engineers
are frequently asked by their friends to tell
them what are the best books to get for
their sons, who intend or think of adopting
the profession of engineering. Solomon's
remark that "Of making books there is no
end" applies perfectly to engineering litera-
ture in the present day, while as regards a
great deal of it his context to the above will
also apply: "Much study—it is a weariness
of the flesh." The production of a
first-rate technical treatise requires a num-
ber of qualities rarely, if ever, found present
in a single person.

We will endeavor to state at least some of
them. The writer must himself thoroughly
understand his subject—be master of it
in every sense of the phrase. He must also
be endowed with the gift of lucidity and
conciseness of explanation, being able to
reach the understanding of his audience, his
class or his readers with the least possible
number of words, figures, letters of refer-
ence or diagrams. He should be facile and
happy in power of illustration—or, in other
words, be able to mold ideas already fami-
liar to the mind of his pupil in such fashion
that they will represent the new ones he
desires to impart. Above all, he must be
unselfish, able to sink his own personality
for the time being, thinking not of displaying
his own learning, but, avoiding "grooviness"
of method, seek to put his subjects before
his pupils in the manner most readily com-
prehended by them, never for a moment
forgetting or losing sight of the object he
professes to have in view, namely, to im-
part knowledge, not to display it. A con-
siderable number of engineering books are
so learned as to be quite over the heads of
most students. Many more are so verbose,
so laden with abstruse formulae, letters, and
diagrams, that the solution of the simplest
question involves hours of time that can ill
be spared from other work. It is no doubt
true that many engineering questions de-
mand elaborate writing to give a precise
answer with mathematical exactness, but
in the majority of engineering practice abso-
lute exactness of such a nature is not neces-
sary, and if a useful approximation will
amplify suffice, and is readily obtainable in
some simply written book, that is the one
that will be adopted.

There is too much paste and scissors work,
too much book-making and padding now-a-
days. German scientific literature is often
so overlaid with mathematics as to render it
useless for any purpose outside the philo-
sopher's study. On the other hand, again,
we have seen treatises on certain mechan-
ical subjects but little, if at all, better than
trade catalogues. Professing to explain the
construction and action of certain machines,
nothing but elevations, evidently taken from
catalogues, were used as illustrations; and
author and publisher only damage their
own reputation by producing such rubbish.
If a man wants to acquaint himself with
the nature and construction of any par-
ticular machine, he has but to go either to
the reading-room at the Patent Office, or to
any provincial free library, and refer to the
patent list and specification, and he will
almost certainly find working drawings
fully, and as a rule concisely, described.
Why, then, should he throw money away
on such books? In many treatises trigono-
metry and algebra are simply done to death.
Scientific writers would do well to take
example from the modern novelists. They
go with the times, and condense much mat-
ter into a small space. Sir Walter Scott
and others are often relegated to the top
shelf nowadays. Unfortunately many
have neither time nor inclination to read
long stories, however good. The same ap-
plies to technical books. Why must we
have grinders as well as schoolmasters?
Why cannot the two be combined? A suc-
cessful grinder, as we understand him, is a
well-informed man who possesses in an
eminent degree the ability to impart his
knowledge quickly and clearly to others.
There is, of course, this difference between
the schoolmaster and the grinder, that the
former has to teach a greater variety of
subjects, and, having only the same time
each day as has the grinder, the progress of
his pupils must consequently be slower.
The latter works in a more contracted
sphere. His subjects are few; and this
fact, coupled with his own special ability,
enables him to teach particular subjects well
and quickly. The fault with some en-
gineering books is that there is too much of
the schoolmaster and not enough of the
grinder about them. On the other hand,
there are most excellent treatises on many
technical subjects to be had, simply and
clearly written, fairly free from—to the
student—perplexing abstract formulae, and
such books are welcomed by all except
pedants.

Two things militate against the production
of first-rate engineering literature. One of
these lies in the fact that those who are
in the daily and hourly practice of some
given engineering work have seldom either
the time to write or the conviction that any-

thing they know is worth writing or likely
to interest any reader; and, secondly, very
many men of conspicuous ability in other
ways really do not know how to write.
Coming now from generalities to particulars,
we must say a few words about publishers.
As a rule their part of the work is done
admirably, so far as what we might call the
equipment of books is concerned. Whether
as regards size, quality of paper or letter-
press there is hardly any room for improve-
ment, but the engravings are not always
good. Much carelessness is often noticeable
in the printing of letters of reference.
These, which are as a rule of first-rate im-
portance, are sometimes misplaced, and fre-
quently some are altogether omitted, with
the consequence that the student has to pass
the said illustration by, not having time at
his disposal to hunt up the meaning of the
reference himself. We are convinced that
all the instruction contained in a great
number of the engineering books already
published could be printed much more simply
and concisely, and also much more lucidly,
if authors sought only to impart their
knowledge with the greatest brevity, with-
out thinking at all of displaying their own
learning or seeking to make a thick volume.
Some of our universities, technical schools
or scientific bodies would, we fancy, do
good work by extending the essay system a
little by offering prizes for the best treatises
on given subjects; brevity, simplicity and
clearness should be the three essential con-
ditions of success.

The Manganese Beds of the Warm Springs Basin.

A little distance west of the French Broad
River and just within the limits of the State
of North Carolina is one of nature's most
singular freaks. There, entirely surrounded
by high mountains of Potsdam sandstone, is
an elliptically-shaped valley, the rocks of
which are Quebec dolomite, and they, as
well as the surrounding sandstone, are
pitched at a steep angle. At the upper end
of this area, immediately on and in the
French Broad River, and just before the
dolomite limestone is cut off by the Potsdam
sandstone, are the Warm Springs. The
water bursts up through the limestone in
more than a dozen places at temperatures
varying from 90° to 130°, and from these
springs I have given the name to the singu-
lar basin which lies to the northwest. This
basin is about 8 miles long and from 1
to 3 miles wide; on its northern end
are large beds of limonite, and on its
whole western side is a continuous belt of
manganese ore. While the ore may be
in a series of large beds connected,
yet there is no doubt of its con-
tinuity from the old Allen Place near the
North Carolina line to near the Warm
Springs. I found no difficulty in tracing it
even on horseback. This manganese ore
has remained comparatively unnoted until
within a few months past, and now there is
a certainty of its being carefully and thor-
oughly tested. Messrs. J. B. White & Co.,
the pioneers and owners of the famous
Crimora Mines, have leased land belonging
to Hon. W. C. Whitthorne and others, and
under the management of Professor Ritchie
have commenced mining operations on a
scale which show a determination to seek
until they find.

The geological position of this manganese
belt is that of a contact deposit between the
dolomitic limestone and the Potsdam sand-
stone, and it occurs continuously in the
lowest valleys as well as on the summits of
the highest ridges that cut across its course.
In the regular line of the vein the ore ap-
pears to be pyrolusite, beautifully crystallized,
but to the east of the line are found beds—
undoubtedly drift—in which the ore is a very
light blue binoxide, only slightly and fine y
crystallized. A cut has been made across
this ore which is perfectly vertical, and some
very handsome ore taken out. This cut,
however, only develops it for about 10 feet
from the surface. The strike of the clays
and slates at that point is near east and
west, while the general course of the main
line of ore to the west is about southeast
and northwest. Assuming a similarity of
formation to that at Crimora, Professor
Ritchie has gone south of the cut above
mentioned and is sinking a shaft at 35 feet.
He had not reached any ore—in fact, had not
gone through the bowlder drift.

The question of practical importance is,
What effect is this lead of manganese ores to
have on the supply for the use of steel man-
ufacturers? My observations cause me to
conclude that it is a continuous lead for
more than 6 miles; that the average vein is
fully 3 feet wide, while there are undoubt-
edly beds which spread out much larger.
This lead of ore is nowhere over 3 miles
from the East Tennessee, Virginia and
Georgia Railroad or the W. N. C. R. R., and
at some places in 1 1/2 and 2 miles. The first
road connects direct to Cincinnati and Lou-
isville on the west and to Roanoke and Nor-
folk on the east; the latter to Norfolk and
the North. Water for washing is abundant
from never-failing mountain streams.

As to quality: I made a selection of the
average from five different places on this
lead of ore, and they were sent to Prof.
Jas. A. Burns, of Atlanta, who analysed
them, with the following results:

	Metallic manganese.	Phosphorus.
No. 1.....	41.71	0.168
No. 2.....	38.27	0.064
No. 3.....	42.80	0.167
No. 4.....	48.91	0.157
No. 5.....	44.00	0.254
Average.....	42.976	0.154

As to what depth this lead of ore may
reach no one can tell, but the formation
indicates possibility of great depth, and its
surface persistency gives further evidence
to that end. Its quality is such as to make
it desirable to steel manufacturers, and,
should investigations prove the quantity
large, this belt of ore will take no small part
in the item of future steel manufacture. It
may not be out of place to say that there
are other properties not yet absorbed by
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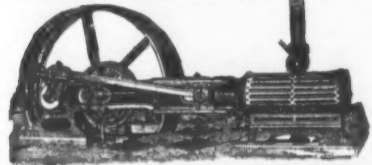


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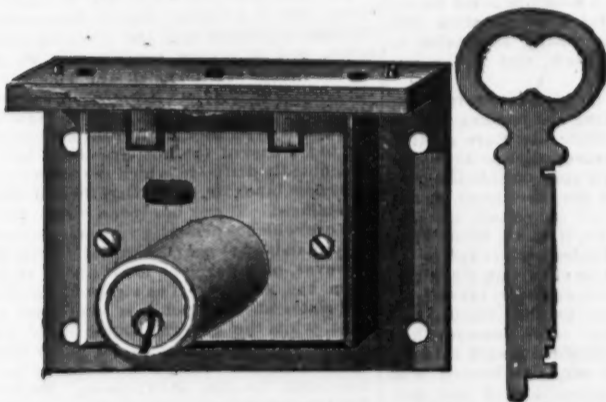
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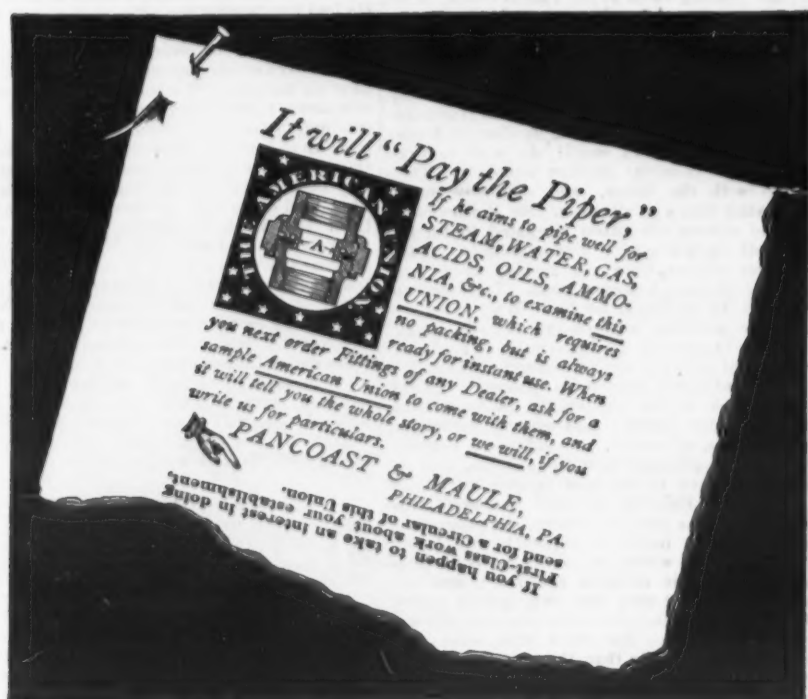
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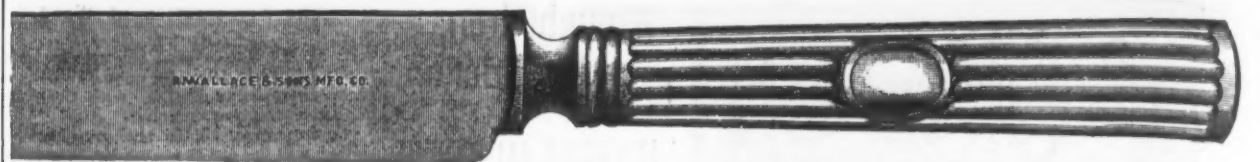
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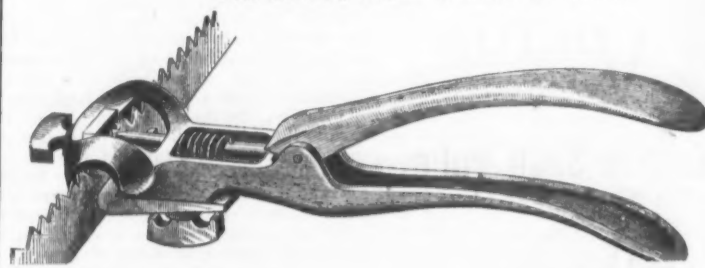


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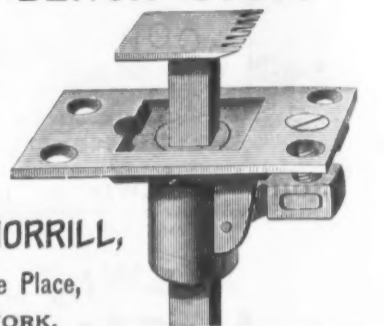
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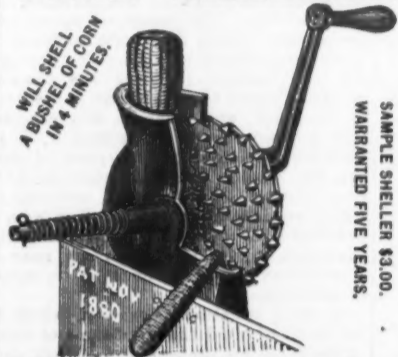


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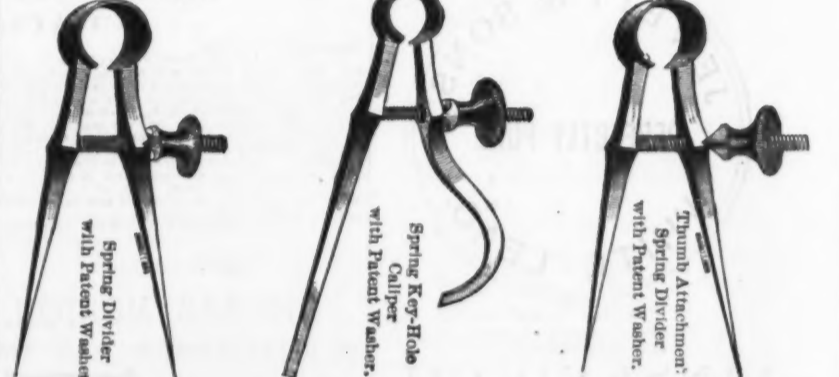
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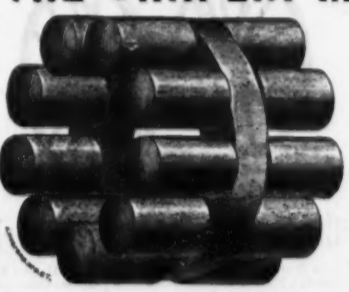
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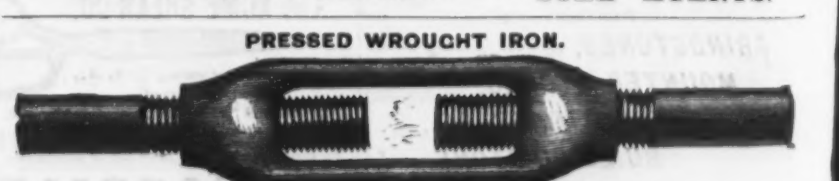
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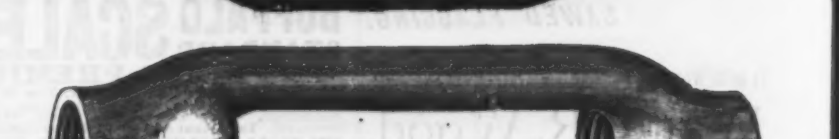
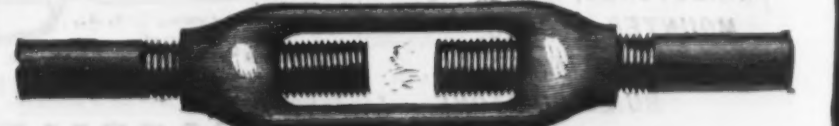
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THE WEEK.

The foreign consuls in Southern China have been compelled by civil disturbance to abandon the country.

Architectural plans for new armories in this city are under advisement by the Armory Board.

The managers of the American Institute announce that the 55th annual industrial exhibition will open at their building, Third avenue and Sixty-third street, on September 29. The building is being renovated and repaired. From present indications the exhibition promises to be successful. Every available space has been taken. Many inventions will be shown this year for the first time, particularly in the machinery and furniture departments.

New Orleans has expended \$2,000,000 on new buildings during the past year, ending September 1.

The large rag importing firm of Lockwood & McClintock, whose failure occurred last week, attribute that misfortune to the onerous operation of the rag disinfecting law. In a recent instance they were compelled to pay \$10,000 for steaming a single cargo, while the cargo itself depreciated in value perhaps an equal amount, not to speak of the costs of prosecution in another recent case.

The only oleomargarine stamps yet definitely decided upon are those representing the manufacturers' special tax of \$600 and the 10 pound special stamp, which has nine coupons, so that two or more stamps can be used upon packages containing more than even multiples of 10 pounds of oleomargarine.

The work of laying the electric subway, now in progress, involves engineering difficulties of considerable magnitude, on account of the network of gas and water pipes, which prevents a resort to blasting. To complicate the difficulty many huge boulders are encountered.

The Jeansville, Pa., Iron Works have just shipped a complete mining plant for the antimony mines of Sevier County, Ark., which are being successfully worked by Wm. F. Roberts, Jr., lately of Hazleton, and a metallurgical works will be constructed near by.

The red granite quarries at Westerly, R. I., are employing 500 men.

To finish the capitol at Albany will require the expenditure of \$1,500,000, according to the latest estimates, and nearly \$1,000,000 in addition for extraordinary work necessary for the preservation of the structure.

By a recent investigation it is found that the population of Gloversville, N. Y., has reached over 10,000, an increase of 4000 since the last official census was taken. There are at present 110 glove manufacturing and 178 concerns connected with the glove industry.

The prospects are considered to be favorable for the speedy construction of the Storm King Bridge at Cornwall. Engineers have been ordered to commence work at once in surveying a route from Brewster's through Putnam County, touching the great iron-ore beds.

Extensive purchases of water rights have been made in Passaic and Sussex counties, in New Jersey, and in Orange County, N. Y., by capitalists known as the North Jersey Water Company, and it is conjectured that the design is to obtain control of the future water supply of Newark and Paterson.

Respecting the alleged conspiracy to kill Mr. Powderly, Robert D. Lawton, of Pittsburgh, ex-secretary of the General Executive Committee of the Knights of Labor, charges that it originated with the Home Club as long ago as 1882, and grew out of the trouble with the Duryea Starch Company at Glen Cove; that it was long a subject of correspondence between the East and West, and that his own life has repeatedly been threatened. The report of Mr. Powderly's intended resignation is discredited by Knights of Labor in this city.

The Republic of Guatemala, in its efforts to obtain financial relief, has resorted to the extraordinary method of imposing a tax of 15 per cent. upon all imports after September 30, in addition to the established duties.

A war of rates among our local gas companies is considered inevitable.

Andrew Carnegie has written a letter to the Lord Provost of Edinburgh, offering \$125,000 for the establishment of a free library on condition that Edinburgh release the property from taxation.

The flow of natural gas in Pennsylvania was much disturbed by earth tremors simultaneously with the destruction in Charleston from a similar cause. In some wells the pressure increased from 800 to 1000 pounds per square inch, while in others the gas disappeared altogether.

The Pittsburgh Chain and Axle Company were burned out in Allegheny City on the 31st ult.

A committee of the creditors of the firm of Martin Kalbfleisch's Sons, which failed some time ago, have taken charge of the Bushwick Chemical Works, the Bayonne

Chemical Works, and the Buffalo Chemical Works, and they are to have entire control over the business of the defunct firm.

The bar and muck mills and eight-inch department at Zug & Co.'s iron works, Pittsburgh, were totally consumed by fire on Saturday evening. The fire started in the oilroom and spread so rapidly that by the time the fire department arrived the large structure, 350 feet long by 200 wide, was in flames, and the firemen devoted their attention to the adjoining property. The loss will reach \$60,000, which is fully covered by insurance in Eastern and foreign companies. McIntosh, Hemphill & Co.'s foundry, on the opposite side of the street, was damaged to the extent of \$1000. The origin of the fire is not known. The destruction of the mill will temporarily throw out of employment 250 men. It is said to be the intention of the firm to rebuild at once.

Petroleum has been found in paying quantities in New London, Conn., and oil works are to be erected. No one thinks about whales any longer.

Tippo Tib, the greatest slave and ivory trader in Central Africa, lives at the principal trading point on the Upper Congo. His rich caravans are often dispatched to the coast. He is now on his way to the Indian Ocean in response to a letter from the Sultan of Zanzibar requesting a visit.

The first of the proposed monthly auction sales of tea in San Francisco on the 24th ult. does not seem to have been a brilliant success. The absence of prominent dealers was noteworthy.

The Connecticut tobacco crop has been secured in fine order and will bring more remunerative prices than for several years. The yield in the principal valleys ranges from 1500 to 2000 pounds per acre, the highest qualities selling at 20 cents per pound.

A new circular from the Dominion Customs Department at Ottawa enjoins upon the officials greater vigilance in enforcing legal measures against the importation of goods from any place out of Canada. Only British vessels belonging to powers who are in treaty with Great Britain, the circular states, can be allowed to go from one Canadian port to another for cargoes.

A Pennsylvania paper says the Allegheny and Bradford oil fields continue to supply about one-half the total oil production of the United States, but in new wells and new operations occupy but a small space in trade annals. The new production for the past month is the largest recorded for a single month since August, 1882.

The National Board of Steam Navigation, at its sessions in this city last week, condemned the use of electric lights in Hell Gate Channel, at the Battery and elsewhere, as blinding pilots by their excessive brilliancy. An election for officers was held and resulted in the selection of the following: President, J. L. Fisher, of New York; vice-presidents, B. D. Wood, of New Orleans, and F. A. Churchman, of Philadelphia; treasurer, Addison Lyle, Pittsburgh; secretaries, J. W. Bryant, New Orleans, and Charles H. Bover, New York. Congressman Negley, of Pittsburgh, in a carefully prepared address, argued that the crippled condition of American commerce was owing to the absence of adequate water transportation, with direct and cheap mail service. Having to compete with ambitious nations who have established their powerful merchant marine through the aid of generous subsidies and liberal maritime laws, the United States must adopt a like system to give her shipbuilders and merchants an equal chance. The free registry of English-built vessels will not provide a remedy. The extension of our foreign markets, it was further urged, affords the only hope of relief from the burden of surplus products.

A dredging-machine company in Nevada propose to recover a goodly portion of the many millions in gold and silver sulphurets, amalgam and quicksilver which have been continuously flowing from the various mills and works engaged in the reduction of the ores from the famous Comstock lode during the past 25 years, or since the discovery of the lode.

The coastwise arrivals at this port during August were the largest for many years, if not unprecedented, the total being 1566.

The Treasury Department decides that new yellow sheathing and nails held on board of a vessel must be entered and pay duty, or a bond must be given that they will not be landed in the United States.

Captain Dutton, of the United States Geological Survey, finds that Crater Lake, in Oregon, has a maximum depth of 2005 feet, and is entitled to rank as the deepest body of fresh water in the United States.

The Village Improvement Society of Stockbridge, Mass., during the year planted trees, sprinkled streets and kept the paths clear in winter, but their best use seems to be the encouragement of private enterprise and the inspiration of public authorities.

The Argentine Republic rivals Peru in its palmy days as a field for railway enterprise. In the River Plate countries new projects are constantly before the public,

and another foreign loan in furtherance of railway development is proposed by the Provincial Government.

It is a noteworthy fact that since the exclusion of American hog products cases of trichinosis have not decreased in Germany.

The shipbuilding trades of the United States do not yet indicate any substantial improvement attributable to recent legislation designed to remove burdens and disabilities. Our merchant marine has touched a level even below that of the little poverty-stricken Kingdom of Norway. In 1884 it would appear that country had 1,583,434 registered tonnage, while the United States had but 1,304,221.

Lake freights have received a further impetus, and if the ore and lumber interests call for more vessel room, as appears probable, grain freights are not likely to go down again this season.

It seems now that all hopes of an amicable settlement of the difficulties between the master plumbers and the journeymen plumbers' union are at an end. Between the master plumbers and the journeymen about 350 journeymen plumbers are out of work. The master plumbers locked out 82 men a week ago for refusing to work under the association apprenticeship rules, and the journeymen struck on Friday because the master plumbers would not regulate their shops according to the journeymen's rules. Both sides are determined. The master plumbers say it would be money in their pockets to yield to the journeymen, but the association is fighting for the principle that all young men who want to learn the trade can have a chance if the master plumbers want apprentices.

Two large steel steamers are to be built for the Baltimore and Ohio Railroad Company to carry freight and passengers between Staten Island and the Battery. The company are now admitted to the privileges of Castle Garden in common with the pool roads.

Lockport, N. Y., celebrated with great enthusiasm the completion of the new Main street iron bridge across the Erie Canal.

Private advices from Kingston, Jamaica, just received, announce that the island of Jamaica was visited by a terrific cyclone and wind storm on the 19th of last month. Entire plantations in the interior of the island were laid waste, buildings were unroofed, vessels in the harbors were driven ashore and an immense amount of property destroyed. Coffee and orange plantations suffered severely.

A company to manufacture stoves have been organized at Birmingham, Ala., with a capital of \$200,000, of which \$150,000 were subscribed by the head of a stove-manufacturing firm of Albany, N. Y. This, with the practical removal of the Baxter Stove Works from Louisville, is regarded by iron men as the first of numerous iron-casting works at Birmingham.

Nebraska is being fast made accessible by improved means of transportation. There are now in course of construction 200 miles of track, tapping the Great American Desert, one of the richest agricultural districts in the West. On Saturday the Burlington opened a line from Aurora to Hastings, which makes the connecting link between two branch systems and taps valuable territory. The lines of this road now under way and those contemplated as a portion of this year's work aggregate 414 miles. The Union Pacific and Missouri Pacific are also making rapid strides. Altogether 1000 miles of new road will be opened in Nebraska this year.

A reunion of the Brotherhood of Locomotive Engineers was held on Saturday in Scranton. At a secret meeting held in the morning a resolution was adopted expressing strong approval of Grand Chief P. M. Arthur during the recent labor troubles in the West and Southwest. In the afternoon a public meeting was held. Mayor Ripple welcomed the engineers to Scranton, and addresses were made by Shannon McGuire, Congressman Scranton and Grand Chief Arthur. About 1500 engineers were in attendance.

The city of Charleston, S. C., was partially destroyed by successive shocks of earthquake on the night of August 31 and the day following. The earthquake center appears to have been near Columbia, in that State, where the earth opened in wide fissures, from which torrents of mud and sulphurous fumes issued, according to one account mingled with flames. The city assessor says that the loss will readily reach \$10,000,000. The taxable property aggregates \$22,000,000. Then there is the non-assessable property, churches, schools and charitable institutions, aggregating \$10,000,000. As the greater portion of the property destroyed was inherited by old families who have no surplus means, it is believed that only a portion will be rebuilt. The City Hall and nearly all the principal buildings were shattered more or less, while others of fragile construction fell in ruins. Two well-known merchants lost their lives, but with these exceptions nearly all the victims, numbering about 50, were colored persons. It was observed that iron buildings suffered no injury. Among the extraordinary phenomena, on the South Carolina Railroad the rails buckled in repeated instances from the contraction of the earth,

and two trains were wrecked. Wharf property and warehouses in Charleston received little or no injury.

The explosion of the boiler of a steam threshing machine in North Greenbush, N. Y., caused the death of the engineer and two other persons.

The New England Shipbuilding Company, of Bath, Me., on Saturday announced to their 200 employees a reduction of 25 cents a day in wages, commencing at once. The pay will range from \$1.25 to \$2. The men will refer the matter to the Knights of Labor.

Minneapolis is turning out more than 25,000 barrels of flour a day, or enough to supply the three largest standing armies of Europe.

The Anchor Line steamship *Susquehanna*, the largest and best-built steamer ever floated on the Great Lakes, was successfully launched from the Union Dry Docks, at Buffalo, on Saturday. She is owned by the Erie and Western Transportation Company, and was built from designs furnished by George B. Mallory, of New York, at a cost of \$225,000.

The Erie Railway station in Jersey City caught fire on Saturday night from the explosion of kerosene in the Pullman repair shops, and five buildings, including the storerooms of the master mechanic, were totally destroyed, together with 18 cars, entailing a loss of \$200,000.

The imports of silk manufactures at the port of New York during August were valued at \$4,000,000, which is larger than in any corresponding month for several years.

The British steamship *Preston*, which recently cleared from Baltimore for France, laden with wheat, was built to pay. She has triple-expansion engines, makes 10 knots an hour, and consumes only 10½ tons of coal a day.

A brick warehouse in St. Louis, used for the storage of railway spikes and other heavy materials, suddenly gave way beneath the pressure, and the entire roof was precipitated into the interior of the building.

The green-glass manufacturers of New York, New Jersey and Pennsylvania are resolute in their resistance to the demand of the blowers that apprenticeship shall be abolished.

The labor organizations of this city observed Labor Day in common with those of other cities, and forming in procession had between 15,000 and 20,000 men in line, under James P. Archibald, grand marshal, and the whole body passed in review before Mayor Grace at Union Square. One feature in the procession was the exhibition of various trades, the carpenters and horseshoers taking the foremost position. The iron and metal workers were in the eighth division, under James Montgomery, marshal, and their banners in numerous instances were suggestive of the boycott. Among the other invited guests were many well-known labor agitators, politicians and lawyers, among them being Edward King, John Swinton, Robert Blissert, Col. Ethan Allen, Samuel Holsinger, Samuel Gompers, Rev. Father McGlynn, Dr. N. T. Jackson, Louis F. Post, Colonel Hinton, of the United States Labor Bureau, and Mme. Delescluze. In Newark, N. J., the number of men on parade was over 15,000.

Eight-inch steel guns will be furnished to the three new cruisers *Boston*, *Atlanta* and *Chicago*, the first ever made in this country. The forgings are made in England. The gun is 21½ feet long. The 8-inch steel Army gun is next in importance and has been fully tested. The tube and jacket are English, but the hoops and the breech mechanism are forgings obtained from the Midvale Steel Company, of Pennsylvania. This gun is of about the same length as the navy guns, and weighs about 13 tons. These, however, are not the largest guns that we are to expect, even without further legislation of Congress. There will be 10-inch guns, both army and navy. The 10-inch naval gun will be 27½ feet long, weigh 26 tons, or double the 8-inch, and throw a projectile of 500 pounds.

The great St. Louis trade festival will continue from September 8 to October 28, and is expected to surpass the grand exposition of 1884, when there was realized a net profit of \$55,700. Twenty-five of the leading agricultural-machine dealers of the country and 40 wood and iron workers have sent on representative exhibits.

Secretary Turner, of the Knights of Labor, solicits the views of the order upon the expediency of establishing a labor journal, to cost \$250,000 per annum for running expenses.

There were sent West from Philadelphia, on the 5th inst., via Pittsburgh, four soda locomotives from the Baldwin Locomotive Works. They are bound for Minneapolis, Minn., and are to run in the streets of that city, where steam engines are forbidden. The engines look like ordinary passenger cars. The works in Philadelphia have orders for four more soda locomotives, provided these sent to Minneapolis prove successful.

At a mass meeting of the Knights of Labor, held in Charleston on the 6th inst., the following rate of wages for mechanics

and laborers was agreed to, a raise of 50 cents having been made in each class: Bricklayers, first class, \$3.50; second class, \$3; carpenters, first class, \$3; second class, \$2.50; third class, \$2; painters, \$2, \$2.50 and \$3; plasterers, \$2.50 and \$3; tanners, \$2.50 and \$3; laborers, \$1.50 and \$2.

President Cleveland, on being interrogated respecting the appointment of Collector Magone, stated the reasons governing his action as follows: "In the first place, it makes very little difference where the man comes from if he properly fills his position. That is the main point. The merchants recognize it. In the second place, I wanted to steer clear of local political complications and to give no reasonable cause for complaint on the part of any one. In a word, I had an eye single to the immense commercial interests of the country, or, if you will allow me to repeat myself, I wanted a business position filled by a business man who would do his work in a business way. That is the long and the short of the whole matter."

The committee of the Central Labor Union, appointed to obtain relief for the families of the imprisoned Theiss boycotters, reported that \$420.33 had been collected, and that the committee of the socialistic labor party had collected \$700.

The "geyser" well at Belle Plaine, Iowa, which commenced to eject water with tremendous force almost simultaneously with the earthquake in South Carolina, is discharging about 5,000 gallons daily, with a pressure of 25 pounds to the square inch. There is no immediate danger from the overflow. The 5-inch pipe to be sunk with the cone-shaped top will be 75 feet in length, and the success of the experiment will depend upon sinking it in the exact center of the well. If this does not succeed a 20-inch life well will be sunk below the water-spout, which is expected to stop the flow, as the last well stopped the other seven.

The convicted anarchists of Chicago are innocent compared with some other classes of agitators, if we may believe Parsons, their leading spirit. It cannot be shown, he says, that in this country they have used dynamite for unlawful purposes, "while it is a matter of fact that it has been used by a dozen other other classes of agitators and strikers. The striking dry-goods clerks in New York City blew out a store front with it, and the striking miners in the Hocking Valley used it; so did the strikers at Beverly, Mo. Only three months ago a judge was blown up with it in Canada. The car strikers in St. Louis used it, and finally in Pennsylvania and Ohio during the past year the temperance people have blown up saloons with it, and the saloon keepers in turn have blown up churches with it. But the American socialists and anarchists have never yet hurt anybody or anything with dynamite, as far as I know." Probably this is true, but it is unfortunate they made so much of a parade of criminal intention.

Baltimore rejoices in the renewed activity of the grain trade at that port. In wheat alone the exports for August amounted to 3,116,554 bushels, against 3,426,128 bushels for the 11 months preceding.

San Francisco papers predict that their city will capture the whole trade of Southern Oregon as soon as the connection between the California and Oregon and the Oregon and California roads are made.

Cameron & Barkley, engine-builders and manufacturers of machinery in Charleston, report that their buildings are damaged by the earthquake not less than \$25,000, but their stock is not hurt, and Mr. Barkley remarked: "In fact, I do not know but what our facilities for moving engines and heavy machinery have been increased." With such a powerful auxiliary as an earthquake, the moving of cumbersome articles is done with unusual expedition.

The London correspondent of the *Mexican Financier* states that "a powerful English syndicate has taken the Tuxpan Railway concession in hand, and it is reported in financial circles at the British capital that the syndicate intend soon to begin construction. The scheme is a very extensive one," says the *Financier*, "involving the expenditure of some \$25,000,000 in building a railway through from Tuxpan to this capital, in competition with the existing line from Vera Cruz."

Three Brooklyn supervisors are accused before Justice Walsh of compelling Grandville F. F. Williams to augment the amount of his plumbing bills and afterward borrowing from him for their personal accommodation various sums of money.

The Globe Shipbuilding Company, of Cleveland, have contracted to build a steel freight steamer for Harvey Brown, and are to build another for Captain Cole, of the Grummond Line, Detroit, to cost \$130,000. Moore & Barton, of Cleveland, Ohio, have ordered a freight steamer of Quayles Sons. Captain Joyce, of Portland, Me., is having plans prepared for a 300 ton mackerel steamer to cost \$50,000. The Star Line, of Detroit, Mich., are having plans drawn for an iron steamer to cost \$160,000. The Detroit Dry Dock Company have an order in hand for a large steamer for the Flint and Pere Marquette Railroad Company.

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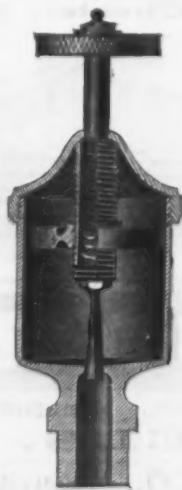
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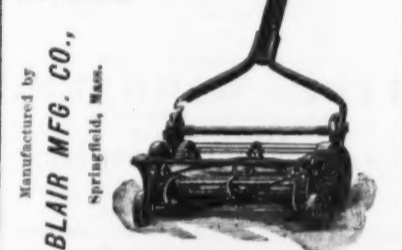


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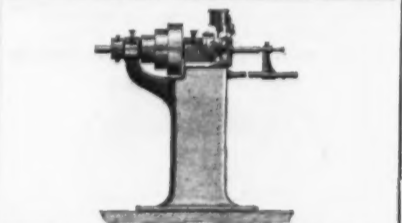


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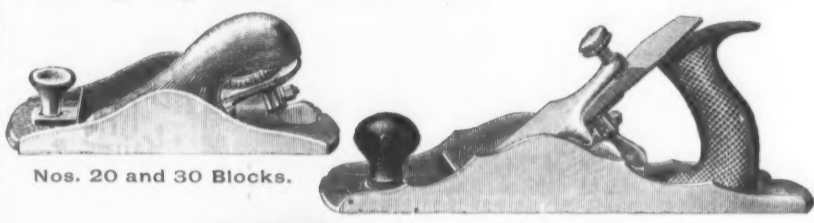
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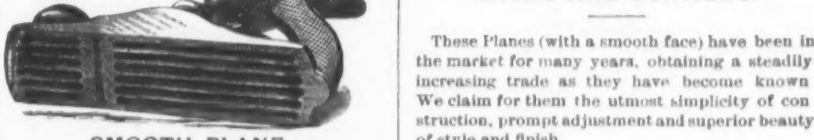
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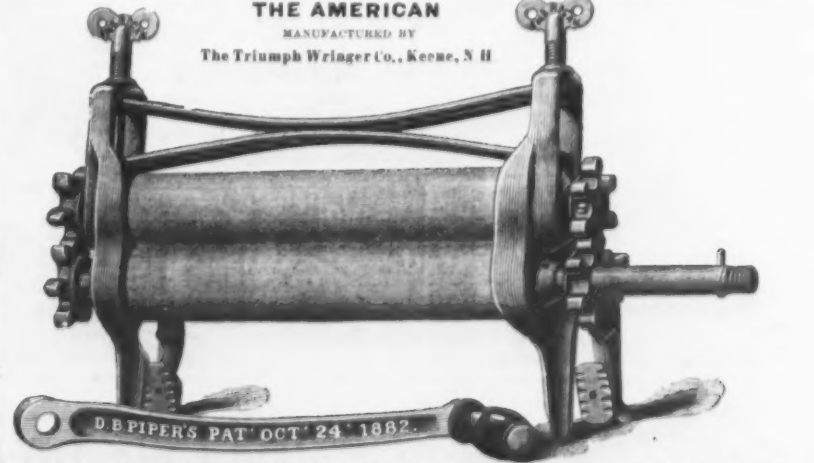


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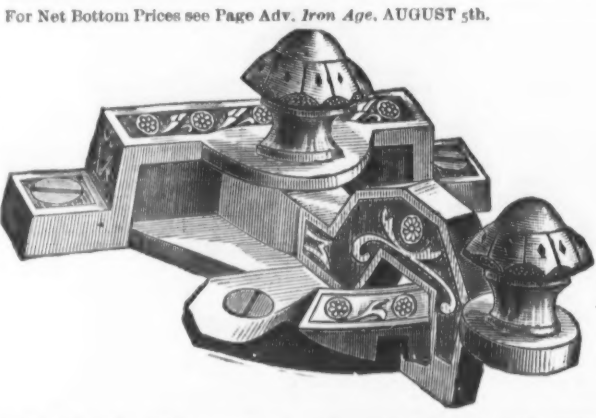
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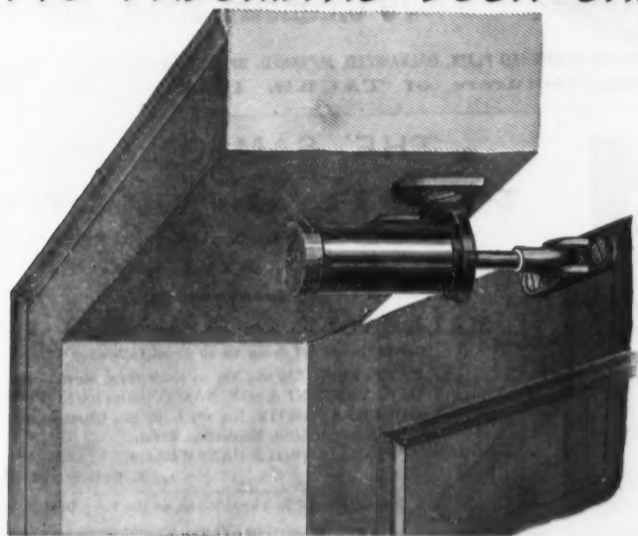
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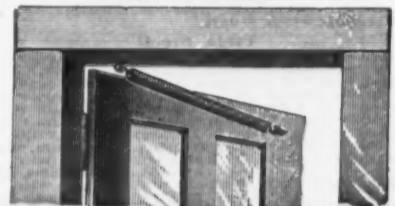


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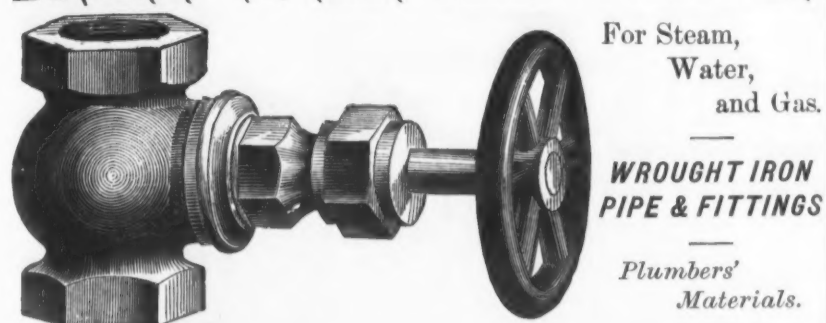
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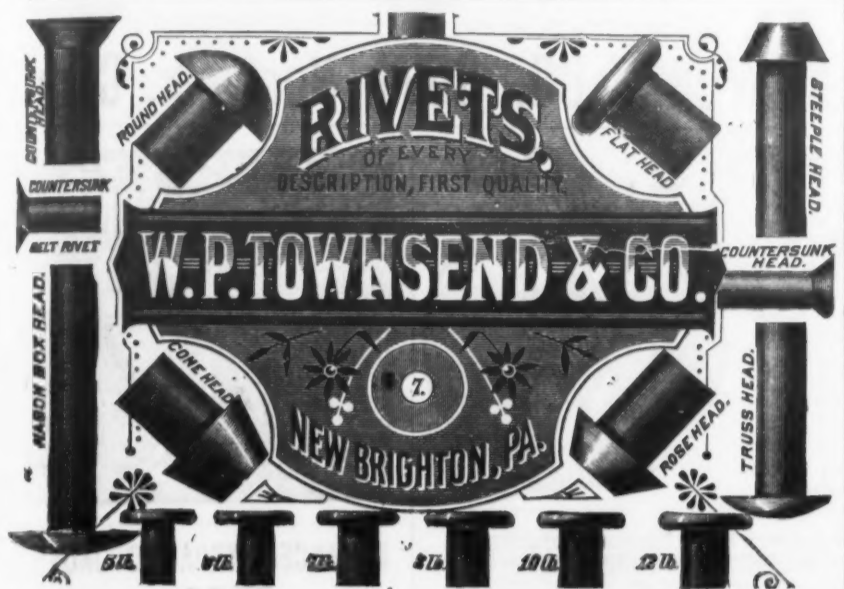
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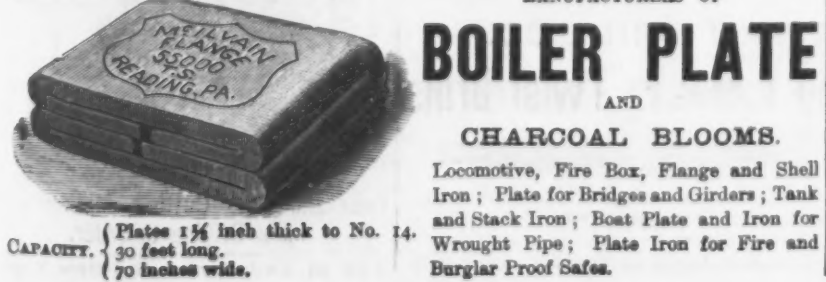
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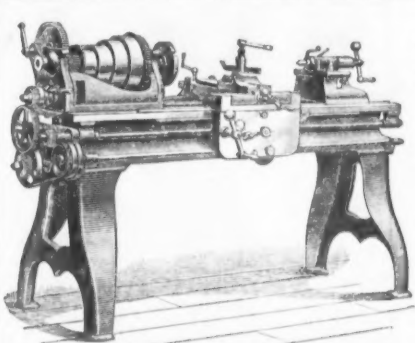
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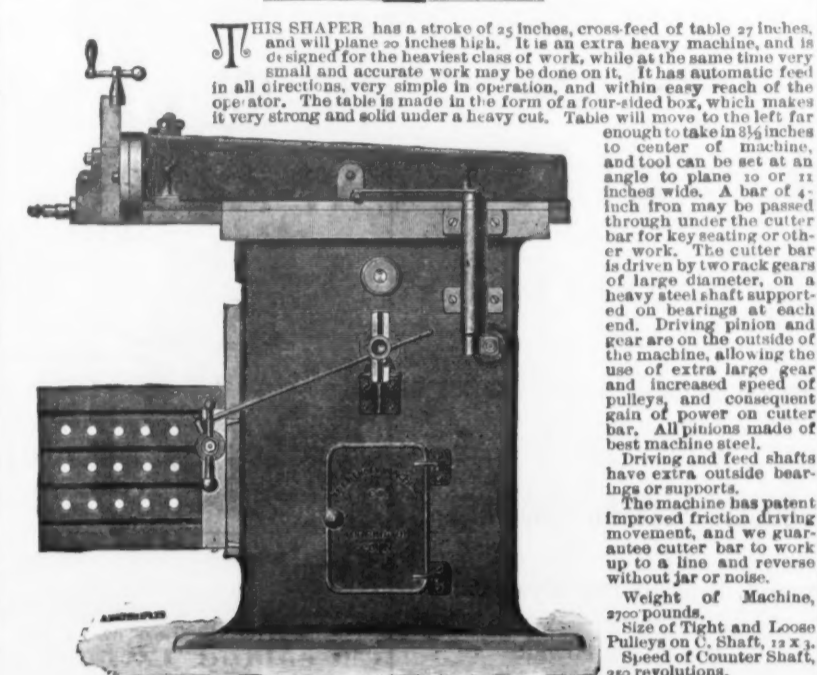


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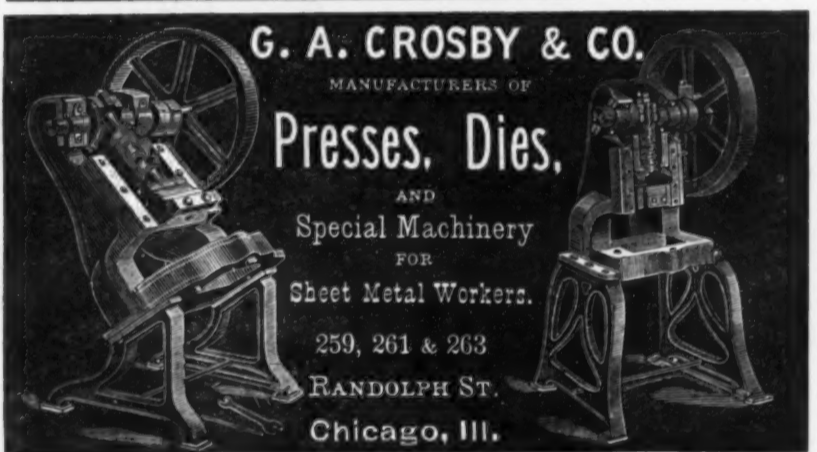
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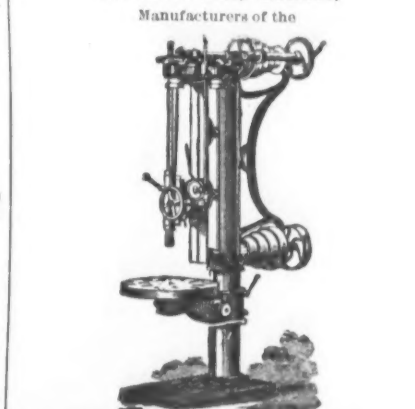
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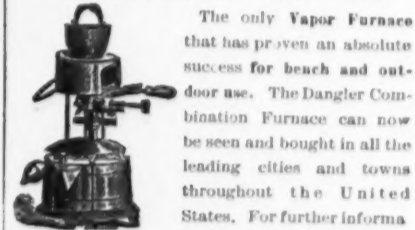
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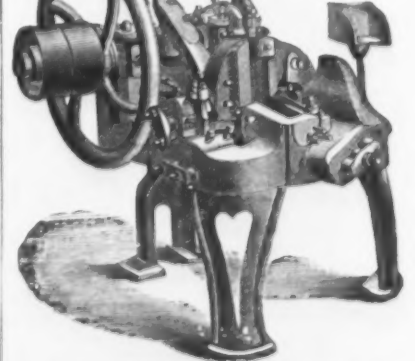
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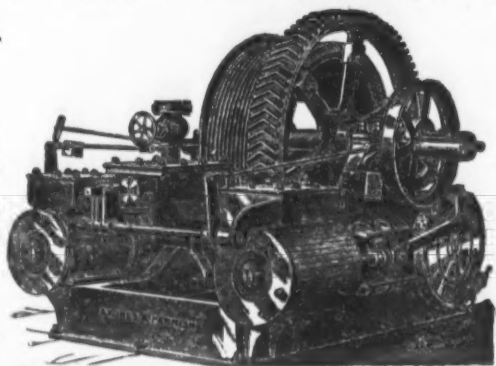


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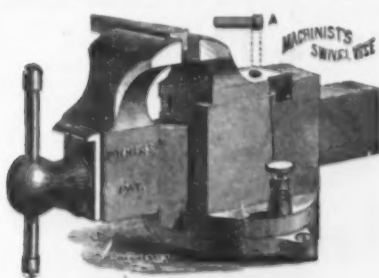
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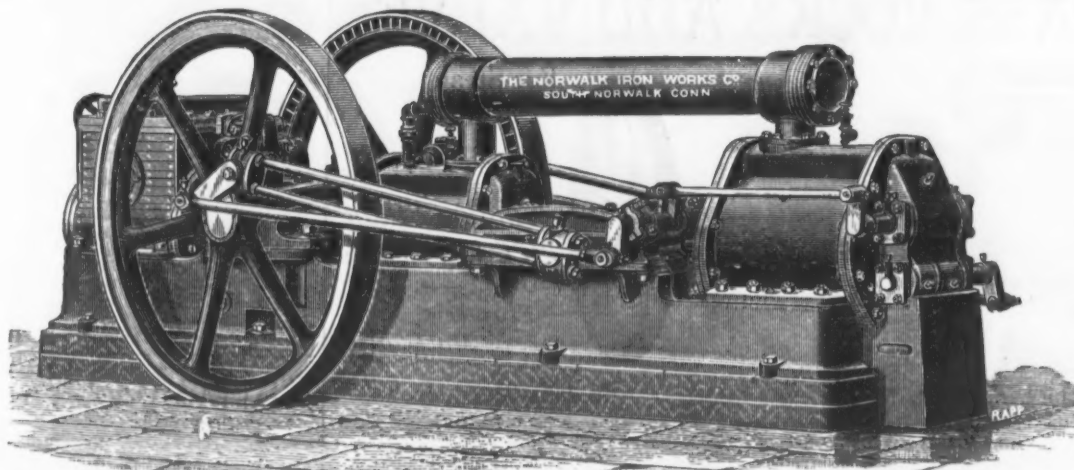
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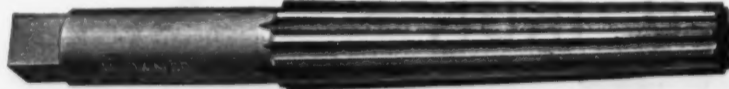
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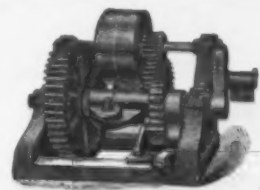
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RIVAL
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CHEAPEST
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\$35.00
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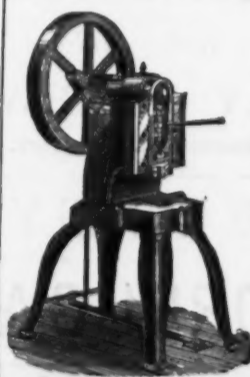
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Upright Drills.

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Power Feed Drills.

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IT WILL PAY YOU.

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The BEST Steam Valve Ever Produced.
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As the plug comes in contact only with VULCANIZED

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All Goods Warranted to Give Satisfaction.

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Parts interchangeable

SIMPLE IN CON-

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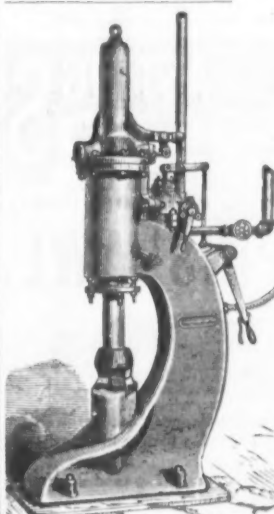
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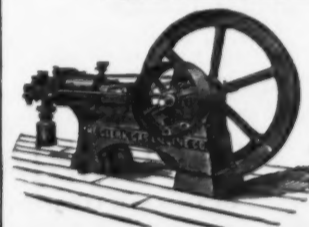
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considerably larger than in any other Gas Engine of
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Over 18,000 ENGINES Consuming 25 to 75 ANY OTHER GAS ENGINE
IN USE Per Cent. LESS GAS than PER HORSE-POWER.



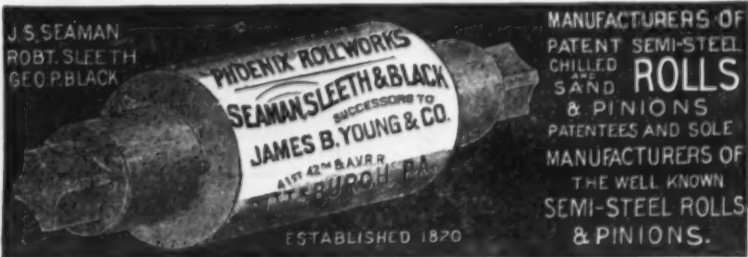
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The Steadiest running Gas Engine yet Made.

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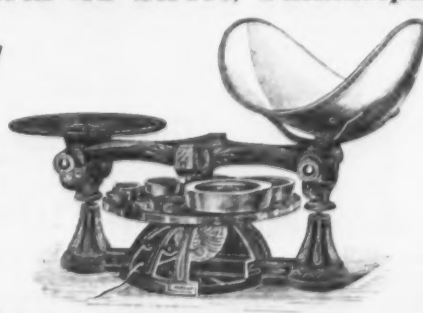
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—IS THE—

Store and Housekeeper's

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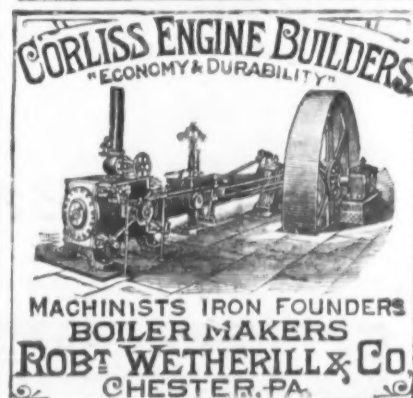
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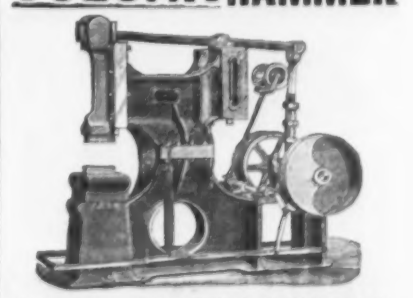
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Difficult to Pick or Remove without Destroying
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QUALITY EQUAL TO STEEL FORGINGS

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Buyers who appreciate the highest class of goods will do well to give this brand a trial.

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STEEL TUBES
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The success of our machine is the best guarantee of its value.
Only machine with Double Helve. Does more and better
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Punching Presses,
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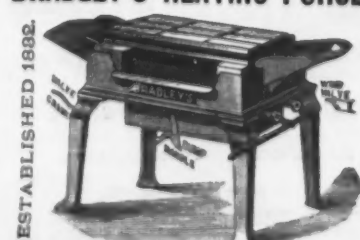
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CLOTHES REEL.**
Made of Grey Iron, extra heavy, with Wood Arms inserted.
It makes a convenient arrangement for drying clothes.
List Price, per Dozen, \$15.00.

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Combines all the
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Has more good
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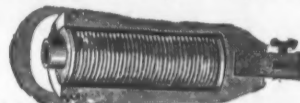
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It contains inside a spool of waxed linen shoe
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The Spool is also hollow, and contains three
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This Tool is for repair work about the house,
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Being of suitable size and weight for carrying
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CUN METAL ROLLS, PINIONS and CASTINGS.
AIR-FURNACE REFINED MALLEABLE CASTINGS.

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UNDER HAINSWORTH'S PATENTS.

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We would call attention of consumers to the fact that we use good material, and produce a steel
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Having had twelve years' experience in the making of **STEEL CASTINGS**, we are able to
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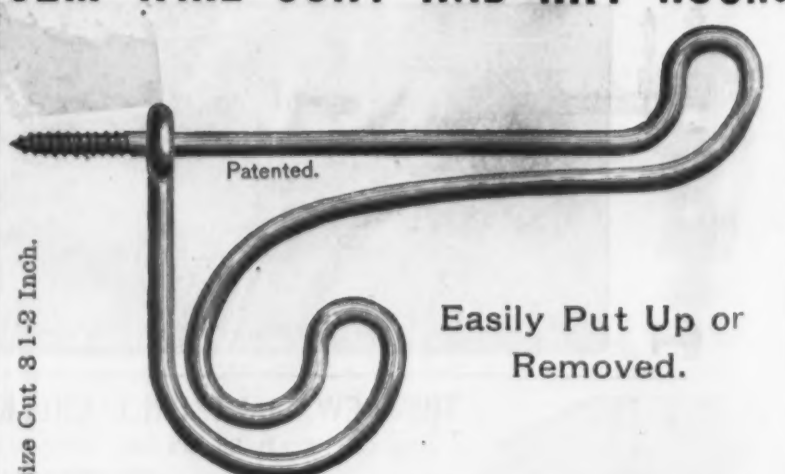
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GEM WIRE COAT AND HAT HOOKS.

Full Size Cut 8 1-2 Inch.

Patented.
Easily Put Up or
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Size	Walnut.		Bronzed.		Coppered.		Tinned.		Brass.	
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2 inch.....	50	\$1.90	150	\$1.75	250	\$2.20	750	\$4.75		
2 1/2 inch.....	60	3.15	160	3.00	260	3.65	760	5.20		
3 inch.....	70	3.55	170	3.40	270	3.40	770	6.60		
3 1/2 inch.....	80	3.20	180	3.00	280	4.60	780	8.75		

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